NTOMOLOGICAL
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*PROCEEDINGS*

*of the*

# ENTOMOLOGICAL SOCIETY of BRITISH COLUMBIA

Volume 42. Issued December 8, 1945

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## RECENT LITERATURE

AN ANNOTATED LIST OF THE SCOLYTOIDEA OF WASHINGTON. By Gordon K. Patterson and Melville H. Hatch. University of Washington (Seattle) Publications in Biology, 10 (4):145-156 (p. 146, 155 and 156 are blank). February, 1945. Price 20 cents.—An introduction names the collections and unpublished files studied, and mentions the important literature. Ninety-eight species of Scolytoidea (bark beetles) are listed, with localities and in most cases the host trees. Anisandrus pyri Peck. is discussed at length.

FIELD CROP INSECTS IN THE PRAIRIE PROVINCES. Bulletin No. 5, published by Line Elevators Farm Service, 763 Grain Exchange Bldg., Winnipeg, Man., 64 p., 33 figs., 2 col. plates. (p. 2 is blank). March, 1945.—This is an excellent handbook, well written and illustrated, with many fine photographs by R. D. Bird. It is "distributed free of charge to farmers and rural schools in Manitoba; Saskatchewan; Alberta; and Peace River Block, British Columbia." The text, except perhaps for the introduction, is by specialists in the laboratories of the Division of Entomology, Science Service, Dominion Department of Agriculture and in the Department of Entomology, University of Manitoba. The insects are arranged by orders, and for each species the recognition characters, life history and habits, and control are discussed. Over 50% of the pests discussed occur also in British Columbia, so the booklet should be of general interest. Note the list of sponsors on the back cover. Copies may be obtained from Line Elevators Farm Service, 503 Herald Building, Calgary, Alta.

A SOURCE-BOOK OF BIOLOGICAL NAMES AND TERMS.—By Edmund C. Jaeger. xvi+256 p., 94 text figs. American ed. by Charles C. Thomas, 220 E. Monroe St., Springfield, Ill., (pub. simultaneously in Canada by the Ryerson Press, Toronto) 1944. $3.50.—Here is a fine book for those who like to know the literal meanings of the scientific biological names and terms they use or read; fully 12,000 are alphabetically listed, usually with one or more examples. The introductory portion contains sections on "How words are built", "Types of names considered", "Transliteration", and "concerning Greek prefixes." Taxonomists will be interested in p. xiii-xxii, in which are quoted T. S. Palmer's lucid and comprehensive statements on the word-formation of generic names (from Index Generum Mammalium. 1904). For those who wish to propose new scientific names, a useful companion volume would be Roland W. Brown's MATERIALS FOR WORD-STUDY, 234 p. Van Dyck & Co. Inc., New Haven, Conn. 1927. $1.15.

CHECKLIST OF THE COLEOPTEROUS INSECTS OF MEXICO, CENTRAL AMERICA, THE WEST INDIES AND SOUTH AMERICA. By Richard E. Blackwelder. Smithsonian Institution (U.S. Nat. Museum) Bul. 185. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.—Part 3, comprising pages iv+343-550, has been issued. Like Part 2 it continues the suborder Polyphaga; species of the families from Lycidae to Tenebrionidae and Cisidae are treated. Price 45 cents.

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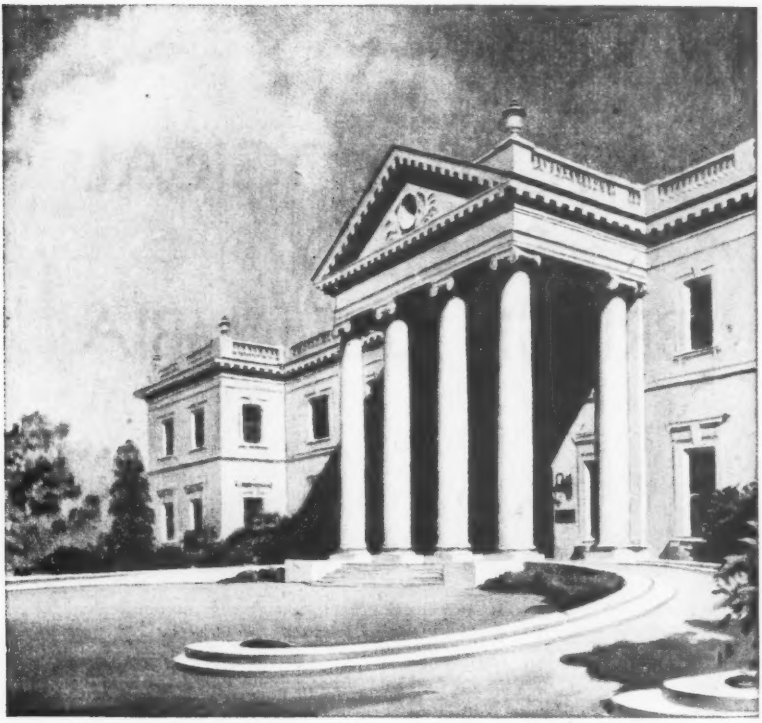

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# THE LODGEPOLE PINE NEEDLE MINER IN THE CANADIAN ROCKY MOUNTAIN PARKS (Lepidoptera, Gelechiidae) [1]

GEO. R. HOPPING
Vernon, B.C.

The needle miner *(Recurvaria milleri* Busck)[2] attacks lodgepole pine *(Pinus contorta* Douglas) and Jeffrey pine *(Pinus jeffreyi* Greville and Balfour). An outbreak in lodgepole pine was noted as early as 1903 in Yosemite Park, Calif., where large areas were affected (Patterson, 1921). This infestation has continued in varying intensity up to the present time. Many trees have been killed by repeated defoliation and many others have been badly disfigured. This miner has also been recorded from the Deschutes National Forest in Oregon (Doane, Van Dyke, Chamberlin and Burke, 1936).

In Canada, a heavy infestation was first noticed by park wardens in early June of 1942 in Banff National Park, Alberta. Over large areas lodgepole pine commenced to turn reddish-yellow in a band on the slopes between the 5,000 and 6,500 foot elevations. This was in the midst of a bark beetle control area and the wardens at first thought it was a terrific increase in bark beetle attack. In 1942, intensive infestation occurred on nearly all slopes on the south side of the Bow River from Vermilion Pass eastward to Brewster Creek. On the north side of the Bow Valley discoloration was evident from Johnston Canyon, westward to Castle Mountain. A small area was also affected near Lake Louise, Alta. By 1944, the area severely affected was extended westward into Yoho Park in the vicinity of Wapta Lake, B. C., and from Vermilion Pass southward into Kootenay Park for a distance of eight to ten miles. A few specimens were also collected in the Sunwapta district of Jasper National Park, Alta., but no outbreaks have been reported from this locality.

Although the first outbreak was known in 1903, eleven years passed before the moth was described (Busck, 1914). It is a small grayish moth with a wing expanse of 12 to 14 mm. The head, fore-wings and thorax are silvery gray, irregularly sprinkled with black scales. The front of the head is silvery-white, the antennae gray and black annulated. The abdomen is mainly silvery-white, the legs more or less barred with black.

Not all details of the life-history have been observed at Banff, but the general development follows that described by Patterson (1921). The moths appear in alternate years: in the odd-numbered years in Yosemite and in the even-numbered years in Banff. In 1942 the peak of moth emergence occurred between July 19 and 24. By July 26 over 60% of the pupae had produced adults. At that time, the jarring of a young tree produced a swarm of the tiny moths like a halo about the crown.

The eggs are deposited usually at the bases of the current year's needles and are generally concealed beneath the needle sheaths. The eggs hatch in from twelve to fourteen days. The emergence of the larvae continues from early August to about September 10.

The young larva enters a needle of the current year's growth and about one-third of this needle is mined the first year before activity ceases for the winter. Feeding is resumed in early spring of the following year. After mining about two-thirds of the original needle, the larva moves to a needle of the new growth during August. By the end of the second year about one-half of this needle has been mined and the larva settles down for another winter. In the following spring the mining of this needle is completed and the larva goes to another needle of the same year's growth. After mining this one, it pupates in the gallery. In years of moth emergence the discolouration of the foliage is more pronounced due to the mining of two needles of the same year's growth

[1] Contribution No. 2345, Division of Entomology, Science Service, Department of Agriculture, Ottawa, Ont.

[2] This determination was not made by a specialist in the group, but was made by the writer after checking specimens with the description (Busck 1914).

by each larva. This practically disappears by the end of September because by then most of the old mined needles have fallen and the mines made by the young larvae in the new growth are too small to cause noticeable browning.

In intensified form the outbreak has been in progress for four years, 1942 and 1944 being the moth flight years. Thus far, the recovery of the trees has been satisfactory except on a small area near Lake Louise, where a few of the older trees appeared to be dying when examined in September, 1944. It is probable that older trees are less able to withstand the miner attack than young stands. In one mature stand on Brewster Creek, the needle miner attack appears to have complicated the bark beetle control work. The weakening of these trees seems to have attracted beetles from surrounding areas less affected by the miner. Consequently, it has been necessary to cruise and burn beetle-infested trees on the Brewster area on three successive years, while other areas required only two treatments.

At the present time it is impossible to predict what the final outcome of this infestation by the needle miner will be. If it should continue for another four years, mortality in mature stands probably would become severe. Fortunately, young reproduction occupies much of the affected area. A more serious consideration is the possibility of bark beetle attack on the mature trees weakened by the miner. As yet there is no indication of any material decrease in the needle-miner population. Several species of parasites have been recovered, but examination of over 12,000 needles showed parasitism to be less than 20%.

## LITERATURE CITED

**Busck, A.** 1914. Descriptions of new microlepidoptera of forest trees. Ent. Soc. Washington, Proc. **16**, p. 144.

**Doane, R. W., E. C. Van Dyke, W. J. Chamberlin and H. E. Burke.** 1936. Forest Insects, McGraw-Hill Book Co., New York and London, P. 303-304.

**Patterson, J. E.** 1921. Life history of **Recurvaria milleri**, the lodgepole pine needleminer in the Yosemite National Park, California, Jour. Agric. Res **21** (3) :127-142.

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POPULATION COUNTS OF POTATO FLEA BEETLES AT AGASSIZ AND CHILLIWACK, B.C. (Coleoptera: Chrysomelidae).—During the course of studies of the new tuber flea beetle, **Epitrix tuberis** Gentner in the lower Fraser valley, a remarkable diminution in numbers of the common western potato flea beetle, **Epitrix subcrinita** (LeConte) has been noted. Population counts of adults on potato foliage have been made each season since 1941 by means of sweeping, the beetles being then killed and counted in connection with our life history studies.

In 1941 75 per cent of those taken were **subcrinita**. In 1942 **subcrinita** out-numbered **tuberis** until June, after which the numbers were about equal. In 1943 the **subcrinita** collected in our sweepings were less than 10% of the total at any time throughout the season, and were usually so few that they were disregarded in our population estimates. In 1944 **subcrinta** was even scarcer and although it emerges from hibernation from two to three weeks earlier than **tuberis**, it was not collected in appreciable numbers even in May, before **tuberis** appears in any numbers, and throughout the season formed less than 1% of the beetle population at any time. These population counts were made both at Agassiz and Chilliwack, and the same conditions were found in both districts.

Although this reduction in numbers of **subcrinita** might be due to a natural cyclical phase, pressure of population by the great increase of **tuberis** in these years may be responsible, though it is difficult to see in what way one species could interfere with the other except during copulation. Parasitism is negligible in either species.—R. Glenndenning, Agassiz, B.C.

EROS THORACICUS IN BRITISH COLUMBIA (Coleoptera: Lycidae).—On July 6, 1934, I took a specimen of **E. thoracicus** (Rand) at Fernie, B.C., on herbage along the bank of the Elk River. W. J. Brown, who identified the specimen, advises me that G. S. Walley found a specimen at Likely, B.C., on July 7, 1938.—Hugh B. Leech.

THE WATER BEETLE AGABUS GRISEIPENNIS IN OREGON Coleoptera, Dytiscidae).—H. C. Fall in his revision of **Agabus** listed **A. griseipennis** LeConte as inhabiting the Rock Mountain and Plateau region. Localities were cited in Wyoming, Montana, New Mexico, Nevada and California (Owens Lake). C. W. Leng in his checklist of Coleoptera noted it from Nebraska and California. H. B. Leech (1942 Canad. Ent. 74(7):131, fig 11) added Utah: Far West; Skull Valley; Provo; California: Lone Pine, Inyo Co.; Bodie, Mono Co. At the same time he questioned the accuracy of the Montana determinations. I have two specimens (det. Leech) from Burns, Harney Co., Oregon, taken June 26, 1941, from a roadside ditch. This is a new record for the state and one I deem worthy of note.—Kenneth M. Fender, McMinnville, Ore.

APHODIUS ALTERNATUS IN BRITISH COLUMBIA (Coleoptera: Scarabaeidae).—On April 19, 1942, a specimen of the pretty, vittate **Aphodius alternatus** Horn (det. W. J. Brown) was found floating in a small pond on top of the Birney range, about a mile south of Vernon. Though dead, the beetle was fresh and in good condition; cattle were numerous in the vicinity, and several species of dung-inhabiting **Aphodius** were in flight at the time.—Hugh B. Leech.

# NOTES ON THE LIFE HISTORY OF THE VAPOURER MOTH (NOTOLOPHUS ANTIQUA BADIA) ON VANCOUVER ISLAND

## (Lepidoptera, Liparidae)

George A. Hardy
Provincial Museum, Victoria, B.C.

Introduction.—The swiftly erratic gyrations of *Notolophus antiqua badia* Hy. Edw. have been abundantly evident to the most casual observer in Victoria during the autumn of 1944. While personal investigations were confined to the grounds of the Legislative Buildings and the Empress Hotel, the moths were reported to be equally common throughout the city and suburbs as well as at up-island points.

Considering the extraordinarily large numbers of the male adults it is remarkable that no prognostication of their appearance in the Victoria area was indicated by the presence of the larvae earlier in the year, which by all the signs should have amounted to a small plague at least. After a search in likely places, about a dozen cocoons of females were obtained, each with its batch of eggs, but not one from which a male could have emerged.

The Moth.—The vapourer moth is a member of the family Liparidae to which belong such notorious species as the gypsy and satin moths. It is of wide distribution and was originally described by Linnaeus in 1758 as *antiqua* from Europe. The American species was known by this name until in 1874 Hy. Edwards designated the western representative as the race *badia*.

The vapourer is a small brown moth with a conspicuous white dot on each of the forewings; the middle third of the latter has a lighter band of bay-brown, while the under side of the forewings and both surfaces of the hindwings are of an ochreous-brown colour. As already intimated the flight is very erratic, and it is about as easy to catch as a windblown leaf on a gusty day. It alights as unpredictably as is its course in flight; suddenly dodging up to the underside of a leaf where it reposes with wings held flat, the forewings concealing the hind pair in such a manner as to give a triangular outline to the resting moth. The long hairy fore-legs from which the insect will sometimes alone depend, simulating a withered leaf, are extended straight out in front. The males were flying during the end of August reaching their maximum number in September and finally dwindling to zero by the end of October.

No females were seen at large. The female averages 12 mm. in length and 5 mm. in width with the vestigial fore and hind wings measuring 3 and 1 mm. respectively. These are flattened sacs, like the collapsed finger of a glove; they, together with the rest of the body are clothed with fine hairs. In shape the newly emerged female resembles a fat grey grub tapering equally at each end and with a lateral band of pale yellow dividing the grey upper and lower surface. The eyes are well developed, antennae relatively short and mouthparts rudimentary. She does not move from the fabric of the cocoon but holds her body at about an angle of 45 degrees until fertilized; the dark chitin-tipped genitalia pulsates rhythmically in telescopic action. Egg-laying begins immediately after copulation. Firmly grasping a portion of the cocoon with her legs and using this as the centre of an arc the eggs are deposited in orderly fashion, the forceps-like ovipositor carefully exploring the place for each egg, feeling out the angle between two other eggs, never laying them off the fabric of the cocoon. When all the space within reach of her ovipositor is covered with the eggs in a single layer, she moves ahead or around the cocoon, anchors herself again and continues until all the eggs are laid. The egg-laying accomplished, she lingers on for a few days and dies without ever leaving the surface of the cocoon.

Eggs were laid at intervals of from 5 to 30 seconds, much depending on how promptly the ovipositor found the exact spot for deposition. In one case 90 eggs were laid within two hours after mating.

What with changing position and an occasional rest the complete batch of from 225 to 300 eggs was disposed of in 4 or 5 hours. The batch is not covered with froth or scales as in some species that lay overwintering eggs.

THE EGG.—The egg is shaped somewhat like a squat barrel, flattened above and below, smooth in texture and of a light beige colour with a central dot and shoulder ring of a darker shade. When first laid it is a pale jade-green, assuming its final colour almost immediately after, in 4 or 5 seconds.

The eggs from which this life-history was worked out were collected at large in September and kept at ordinary room temperature, where they hatched and the larvae were reared. Ova under observation in natural out-door conditions do not hatch nor are expected to until spring-time vegetation is available.

THE LARVA.—The caterpillars were reared on various species of rose, the leaves of *R. nutkana* being relished most. Although the food plant was past its prime and at times difficult to obtain, individuals came through their metamorphosis in perfect condition.

(1) First Instar.—Eggs hatched on November 6th. Length about 2 mm. when first emerged increasing to about 5 mm. as growth proceded. The general colour is a translucent blackish in the initial phase. Towards the end of this instar the three thoracic and the fifth abdominal segments assume a much lighter shade. The whole body is covered with long black hairs, as long as, or longer than the body. The larvae are very active, crawling rapidly and dropping readily at the slightest touch, supported by a silken thread which serves the double purpose of breaking their fall and as a guide to regain their original position. The first meal is made of the greater part of the egg-shell.

(2) Second Instar.—First moult November 21st. Length about 6 mm. Apart from size the most marked development at this stage is the intensification of the light coloured segments to a pale yellowish tinge and the appearance on each of the dorsal surfaces of the sixth and seventh abdominal segments of an orange-coloured gland.

(3) Third Instar.—Second moult December 6th. Length about 10 mm. In addition to the uniform black hairs covering the body of the preceeding instars the characteristic tufts now make their appearance. Two pencil-like ones on first thoracic directed forward, one of the same kind on the eighth abdominal pointing backward, all of black hairs. On the first and second abdominal segments the thick shaving-brush-like tufts or tussocks appear in black, while similar though shorter ones adorn each of the third and fourth abdominals but are of a white or greyish colour. Orange tubercles as before.

(4) Fourth Instar.—Third moult December 11th. Length about 15 mm. Approaching maturity is accompanied by an increasing intensity of colour and perfection of structural detail. The most conspicuous change is in the four tussocks which are now equal in size and of shades of yellow varying from gold to lemon. Most of the body hairs are of a yellowish grey colour.

(5) Full-Grown Larva.—Length 27 mm. The head is a shining jet black, the general colour a smoky drab; a broad dorsal stripe is velvet black edged with broken lines of yellow; the thoracic and fifth abdominal has a further spotting of yellow. The spiracles are black with a whitish dot just to one side of them. Until examined closely this dot could be mistaken for the spiracle itself. The body hairs grow from little raised pads, eight pads to a segment, two above and two below the spiracular line on each side; that immediately above is of an orange colour, the remainder are dusky. The longer central hairs of each pad are black, the rest yellowish.

All the hairs are barbed; on the long body hairs the barbs are short and dispersed over the greater part of their length; on the hairs of the dorsal tufts the barbs are longer and more closely disposed; while on the hairs composing the anterior and posterior "pencils" the barbs are arranged in such a manner as to give a spatulate outline to the tip of each hair.

The tubercles of the repugnatory glands are thin-walled evaginations of the body wall, thicker on the sides but very thin and membranous at the apex. They are distended by an influx of the body fluid through which the regular pulsations of the heart action can be observed. When alarmed the larva flips up the posterior segments, the tops of the glands collapse and are drawn down below the thicker side walls. In a few seconds they are re-distended. No spray could be seen, but the very moist appearance of the outer surface suggests a slight exudation of fluid that may serve some defensive purpose.

The caterpillars are not gregarious, but go their own independent ways. The restlessness of the newly hatched larvae suggests that this habit ensures a rapid dispersal away from the nursery and each other.

THE COCOON.—The cocoon is fashioned in the angle of a projecting ledge or coping or in the crevice of rough bark; sometimes among the twigs of bushes. It is a light transparent structure; the greyish silk being tinged with yellowish from the incorporation into its mesh of the larval hairs. This admixture of hairs is accidental as far as the larva is concerned and is the result of much twisting and turning during the process of cocoon making, further aided mechanically by the barbed nature of the hairs themselves. About two days elapsed between the beginning of the cocoon and the assumption of the pupal garb.

THE PUPA.—First pupation December 22nd. The pupa averages 10 mm. by 4 mm. in the male, 10 by 5 in the female, with wing sheaths in proportion. It is a shining jet black in colour, sparsely greyish hirsute on the dorsal surface. In addition the dorsum of the first three abdominal segments has a small dense patch of short greyish scale-like hairs.

The first imago, a male, emerged on January 18th; from then on emergences continued until all had completed their metamorphosis by February 1st, 1945. The proportion of the sexes was about equal.

SUMMARY.—The eggs are normally laid during the early autumn months, remaining dormant until the following spring. A batch of ova brought indoors under the influence of the higher temperature prevailing there hatched on November 6th. The larvae were fed on the leaves of *Rosa nutkana*, completing their metamorphosis in 70 days in one case, averaging 78 days for those reared through to the perfect insect.

The time required to complete each stage was observed in one case to be as follows: First instar, 15 days; second instar, 14 days; third instar, 6 days; fourth instar, 10 days; pupal stage, 25 days.

A great variation in the rate of development was evident, especially in the early stages. While all the eggs hatched in two days there was a spread of 23 days between the first and last date of pupation. On the other hand only 13 days elapsed between the first and last emergences of the imagines.

CONCLUSIONS.—The possibilities of this species becoming a serious pest could only become a fact in the absence of an active and persistent check such as appears to be the case from the known parasitic infestation. Some such reason may account for its abnormal abundance in 1944.

The number of eggs in a batch is sufficient to quickly populate any given area with larvae. Old egg masses examined showed a 100 per cent viability. Hence the means of rapid increase are present; it only needs a plentiful food supply, mild weather and freedom from parasites or disease to enable their number to reach nuisance-proportions.

LATER NOTE.—In the field, ova hatched on May 25, 1945. Thereafter the larvae were kept in confinement in a cool room. The first adult emerged July 24 making a total period of 60 days to complete the metamorphosis as against 71 days for the first emergence in the material reared last fall. In addition an extra instar appeared with the full fed larva measuring 35 mm., as against 27 mm. in the former lot; apart from size there was no radical change in appearance.

Evidently the fresh young rose leaves

with their higher nutritive qualities as compared with the old faded leaves of the fall and early winter not only provided the means of quicker growth but a shortening of the time to complete development. Milder temperature also has some influence for the pupal period was 11 days as against 25 days in the fall rearing.

A condensed summary of the changes from egg to adult in the spring and summer is as follows: First instar, 5 days; second instar, 9 days; third instar, 7 days; fourth instar, 15 days; fifth instar, 13 days; pupation, 11 days; total, 60 days.

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## A PRELIMINARY LIST OF THE FLESH FLIES OF BRITISH COLUMBIA
### (Diptera: Sarcophagidae)

E. R. BUCKELL and G. J. SPENCER
Dominion Entomological Laboratory, Kamloops, B.C.

In the course of efforts to unravel the problems of natural control factors of grasshoppers, it was necessary to rear sarcophagid maggots that were killing hoppers and to make field collections of the flies. A paper on these flies is in course of preparation, but in the meantime it seems advisable to record the species that have been captured and those that have been reared from their acridiid hosts in the Chilcotin, near Lytton, and on the Lac du Bois ranges at Kamloops. The nomenclature is according to Aldrich's Monograph "Sarcophaga and Allies", Thomas Say Foundation, 1916, brought up-to-date through the kindness of Dr. A. R. Brooks, Division of Entomology, Ottawa.

*Indicates species recorded in literature as parasites of grasshoppers in North America.

†Indicates species reared in this Province from Melanoplus mexicanus mexicanus Saus.

*Wohlfahrtia meigenii* Schiner
**Agria affinis* Fallen
*Sarcofahrtia ravinia* Parker
†*Sarcophaga sinuata* Meigen
*Sarcophaga latisterna* Parker
**Sarcophaga atlanis* Aldrich
†*Sarcophaga hunteri* Hough
†*Sarcophaga opifera* Coquillet
**Sarcophaga caridei* Brethes
†*Sarcophaga falciformis* Aldrich
†*Blaesoxiphotheca coloradensis* (Aldrich)
*Sarcophaga eleodis* Aldrich
†*Acridiophaga aculeata* (Aldrich)
†*Acridiophaga aculeata* var. *gavia* (Aldrich)
†*Acridiophaga aculeata* var. *taediosa* (Aldrich)
†*Sarcophaga reversa* Aldrich
†*Sarcophaga rapax* Walker
†*Sarcophaga tuberosa* var. *harpax* Pandelle
†*Sarcophaga tuberosa* var. *sarracenioides* Aldrich
†*Sarcophaga tuberosa* var. *exuberans* Pandelle
*Sarcophaga sulculata* Aldrich
*Sarcophaga bullata* Parker
*Sarcophaga nearctica* Parker
*Sarcophaga planifrons* Aldrich
*Sarcophaga lherminieri* R.-D.
*Sarcophaga insurgens* Aldrich
†*Sarcophaga kellyi* Aldrich

A large number of female flies which key out to the *aculeata* triplet has been reared from maggots emerging from grasshoppers; without males it is impossible to assign them to a variety: males have been reared only of *S. aculeata*. Female flies of the species *Sarcophaga planifrons* and *S. lherminieri* have been frequently captured, pursuing flying grasshoppers and apparently larvipositing on them; it is possible that they also will prove to be parasites of these insects.

# HISTORY OF THE USE OF BEE REPELLENTS IN ORCHARD SPRAYS IN THE OKANAGAN VALLEY OF BRITISH COLUMBIA

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The Okanagan Valley of central southern British Columbia is essentially a fruit-growing area; with abundance of native honey plants, orchard blossom and leguminous cover crops, it is well adapted to bee-keeping. There are some 24,535 acres of bearing orchard and 3,786 colonies of honey bees in the valley. In the past, apiarists have suffered from loss of field bees, and from poisoned brood, the result of bees imbibing insecticidal poisons applied as orchard sprays.

This paper records the first experiments with bee repellents to be carried out in the Okanagan. Chemicals were added to standard sprays in an attempt to make the liquids unattractive to honey bees. The present work has been done from the viewpoint of the bee-keeper; the farmer is not greatly interested in the fate of the bees unless it can be proven that they are a major factor in orchard pollination.

Brittain (1933:157) concluded that as far as the apple orchards of the Annapolis Valley of Nova Scotia are concerned, both native and hive bees are important, and that colonies of hive bees should be placed in orchards in case seasonal conditions are unfavorable to native solitary bees; also that "Experimental evidence regarding the value of bees for pollination purposes under controlled conditions demonstrates clearly the necessity of bees combined with a supply of suitable pollen for all varieties. Even the most self-fruitful varieties require bees in order to ensure adequate pollination."

Root (1919:338) has the following to say for the danger of using poison in orchard sprays. "The poisonous spray applied to the tree falls on the flowers of the cover crop, and the bees visiting there are destroyed in immense numbers . . . The spraying of the cover crop presents a new and serious problem . . . Unless protection can be afforded bee-keepers they will be compelled to move their bees away from orchards when the owners allow spraying to be done at a time when it may fall on cover crops which are in bloom."

In the winter of 1942, the American Bee Journal carried a report on the work being done by the Massachusetts Department of Conservation in adding bee repellents to orchard sprays. A pint of oil of creosote to 100 gallons of spray was used; 375,000 gallons of spray were applied in a certain area, and a footnote says that "beekeepers in the area covered reported no loss of bees from poison spray when the oil of creosote was used."

This paper was brought to the attention of A. W. Finlay, Provincial Apiarist, who immediately wrote to Massachusetts for a detailed report. In the meantime a bee-keeper in Vernon drew the attention of the Minister of Agriculture, Hon. K. C. MacDonald, to the article in question and he in turn instructed Morrice Middleton, District Horticulturist at Vernon, to investigate the matter thoroughly.

Upon my arrival in Vernon in the spring of 1942 with full information from Finlay, I found the Department of Horticulture all ready to co-operate on a practical test. H. H. Evans and W. Baverstock had a supply of oil of creosote ready and had conducted some experiments with different "spreaders" in order to have it evenly distributed in the sprays. We then had to find an orchard far enough from others to remove any chance of the bees getting poison from sprays that had not been mixed with repellent. We finally chose one five miles northwest of Armstrong.

Fred Bettschen of Vernon offered to supply the bees for the test. We moved 10 colonies into the orchard, and Evans and Baverstock then applied complete cover sprays of two 400 gallon tanks of standard strength arsenate of lead at the same time and at the same intervals that sprays were applied in the orchards around Vernon. The bees were examined by the writer and a committee appointed by the British Columbia Honey Producers' As-

sociation, both before and after every spray was applied. No loss of bees or poisoned brood was found in any examination, and at the close of the season Bettschen harvested 2,160 pounds of honey from the 10 colonies, and the bees had ample winter stores. In an apiary several miles distant, within flying distance of an orchard sprayed without repellents being added, the loss was very heavy, almost all the field bees being poisoned.

We then found out that Evans and Baverstock had only used oil of cresote in one tank of spray each time. In the other tank used they had substituted crude carbolic acid at the rate of two ounces to each 100 gallons of spray. This information gave us two repellents that apparently could be used with perfect safety and equally good results insofar as bees were concerned.

In 1943 the repellents were tested on a larger scale in an orchard where there was a good cover crop of alfalfa, sweet clover, alsike clover and several native honey plants. As in the 1942 tests, complete cover sprays of arsenate of lead, containing one pint oil of creosote to 100 gallons, were used. A second orchard, adjacent to this, was under test with the same number of sprays, but in this case the repellent was crude carbolic acid. A close check up of the thirty colonies of bees in the orchard failed to show any loss of bees.

The formula with oil of creosote was given to several orchardists who were also beekeepers, to be tried out under the usual growers' conditions. In every case a burning of foliage was reported, ranging from slight to severe. This seems to have been caused by the incomplete mixing of the creosote. No loss of bees was reported in any case.

In 1944 the officials conducting the tests decided to abandon the oil of creosote as being unsafe for use by growers and to continue with the more stable crude carbolic acid as a repellent. The orchard used was the one in which the creosote was tested the previous year. Four complete sprays were put on using carbolic acid two ounces to 100 gallons. The atmosphere varied from very moist to very dry during these tests. The cover crop was a heavy one and was in full bloom during at least two of the applied sprays.

The fourth spray varied from the others in that four ounces of crude carbolic acid were used in place of the usual two, to determine if there would be any burning of foliage. No burning whatever was noted.

Another test was carried out by a grower at Peachland, who was supplied with crude carbolic acid and it was applied in sprays by his own men under grower conditions. He had four colonies of bees on the edge of the 48 acres of orchard which were sprayed and the colonies were examined after each spraying. No loss whatever was noted and the bees built up to swarming strength during the time the four cover sprays were being applied.

Several other unofficial tests were carried on by orchardists and in every case "no loss of bees" was reported.

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**BRITISH COLUMBIA AND ALBERTA RECORDS IN E. C. LERCH'S "A LIST OF HOMOPTERA FROM ONTARIO."** Lerch's paper (Bull. Brooklyn Ent. Soc., 28 (2): 76-78. April 1, 1933) lists a number of Homoptera said to have been collected by J. F. Brimley of Wellington, Ont. Actually it includes four species received by Brimley from collectors in Western Canada: **Ceresa basalis** Walker from Malakwa, B.C. (not "Malorwa"!); **Campylenchia latipes** Say, **Bythoscopus robustus** Uhler?, and **Oncometopia lateralis** Fabr., from Medicine Hat, Alta.

The Medicine Hat specimens were collected by the late F. S. Carr. The Malakwa example was taken in 1923 by J. H. Aubrey who at that time lived there and was associated with the Forest Service. Like Brimley, H. M. Speechly of Winnipeg and the late Norman Criddle of Treesbank, Man., Aubrey was a meember of the British Empire Naturalist Association. Most of the insects he took were sent to Brimley, but his collection of Coleoptera, left behind when he went to the antipodes, came into my hands in 1931.—Hugh B. Leech.

# A PRELIMINARY LIST OF THE HETEROCERA OF THE NELSON-ROBSON-TRAIL DISTRICT OF BRITISH COLUMBIA (Insecta: Lepidoptera)

HAROLD R. FOXLEE [1]
Robson, B.C.

The following list had its beginning in a small collection of Lepidoptera made at Nelson by the late Harry Cane, and now in my possession; few of his specimens show dates of capture. Localities other than Nelson represent my collecting; most of the species from Brilliant were taken at light, chiefly at a number of 1,000-watt flood lights.

The Nelson-Robson-Trail district is in the southern part of the West Kootenay region of British Columbia, adjacent to the northeastern corner of the State of Washington. The localities are as follows, and all are within the quadrilateral between the 49th and 50th parallels of latitude and the 117th and 118th meridians of longitude; Warfield is a suburb of Trail.

| | | | |
|---|---|---|---|
| B.—Brilliant. | Elevation | ca. | 1,550 ft. |
| N.—Nelson | " | " | 1,774 " |
| R.—Robson | " | " | 1,410 " |
| T.—Trail | " | " | 1,400 " |
| W.—Warfield | " | " | 1,900 " |

The numbers preceding the names are those of the recent McDunnough "Check List of the Lepidoptera of Canada and the United States of America," vol. 1, 1938; vol. 2, 1939.

### SPHINGIDAE

693 *Herse cingulata* Fabr. (R.) .....June
719 *Sphinx chersis* Hbn. (R.)
721 *Sphinx mordecai* McD.
(R.B.) .....June, July
730 *Sphinx drupiferarum utahensis*
Hy. Edw. (R.) .....June
740 *Smerinthus cerisyi ophthalmicus* Bdv.
(B.N.R.W.) ....May, June, July
741 *Paonias excaecata* A. & S.
(B.R.) .....18.VI.40
742 *Paonias myops occidentalis* Clark
(R.) .....26.VI.39
745 *Pachysphinx modesta* Harr.
(N.R.W.) .....July
770 *Hemaris thetis* Bdv. (R.) ..April, May
789 *Proserpinus clarkiae* Bdv.
(N.R.) .....April, May
790 *Proserpinus flavofasciata ulalume*
Stk. (R.) .....May
798 *Celerio gallii intermedia* Kby.
(B.R.W.) .....June
799 *Celerio lineata* Fbr. (R.) .....May

### SATURNIIDAE

807 *Platysamia euryalus kasloensis* Ckll.
(R.) .....May
812 *Telea polyphemus* Cram.
(N.W.) .....3.VI.43
841 *Pseudohazis hera* Harr. (R.) .13.IV.41

### AMATIDAE

871 *Scepsis fulvicollis pallens* Hy. Edw.
(B.) .....15.VII.44

### NOLIDAE

891 *Celama minna* Butl. (B.) .....11.IV.44
911 *Crambidia casta* Pack (N.)
958 *Hypoprepia miniata* Kby. (N.)
980 *Halisidota maculata angulifera* Wlk.
(B.N.R.W.) .....3.VI.43
991 *Cycnia tenera sciurus* Bdv.
(N.R.W.) .....June, July
1023 *Eubaphe ferruginosa* Wlk.
(N.R.) ..... June, July
1029 *Apantesis ornata achaia* G. & R.
(R.W.) .....May, June
1063 *Leptaretia californiae* Wlk.
(N.R.) .....May, June
1065 *Diacrisia virginica* Fabr. (N.R.W.)
1066 *Diacrisia vagans kasloa* Dyar
(N.R.) .....May
1069 *Isia isabella* A. & S. (B.N.R.)
1070 *Estigmene acrea* Dru.
(B.N.W.) .....May, June
1092 *Parasemia parthenos* Harr.
(B.N.) .....12.VII.44
1096 *Platyprepia guttata f. virginalis* Bdv.
(B.N.) .....June

### AGARISTIDAE

1109 *Androloma mac-cullochi* Kby (N.)
1116 *Alypia langtoni* Couper
(N.R.) .....May, June

### PHALAENIDAE

1152 *Acronicta hesperida* Sm.
(N.W.) .....June, July, Aug.
1155 *Acronicta innotata griseor* Dyar
(R.) .....11.VI.41
1160 *Acronicta grisea revellata* Sm.
(R.) .....16.V.39
1166 *Acronicta mansueta* Sm.
(B.) .....June, July
1201 *Acronicta impleta illita* Sm.
(N.) .....8.VI.04
1211 *Acronicta perdita* Grt.
(B.R.) .....May, June
1232 *Euxoa olivia* Morr. (B.).....21.IX.44
1246 *Euxoa plagigera* Morr. (B.)...30.VII.44
1251 *Euxoa* near *perolivalis* Sm.
(B.) .....14.VII.44
1257 *Euxoa catenula* Grt. (R.).....13.V.37
1274 *Euxoa intrinta* Morr. (R.).....2.IX.38

[1] ACKNOWLEDGEMENTS: I wish to extend my grateful thanks to both Dr. J. McDunnough and Mr. T. N. Freeman of the Division of Entomology, Ottawa. Without their kindly co-operation it would not have been possible to write this list.

1282 *Euxoa* sp. in *holoberba* group (B.) .....18.VIII.44
1284 *Euxoa* sp. in *sponsa* group (B.) .6.VII.44
1289 *Euxoa perfusca cocklei* Sm. (N.)
1310 *Euxoa messoria* Harr. (N.R.) .....Aug., Sept.
1314 *Euxoa terrena* Sm. (B.) .....31.VII.44
1341 *Euxoa tessellata illata* Wlk. (R.) .....4.VI.43
1351 *Euxoa declarata* Wlk. (R.) ..July, Aug.
1352 *Euxoa campestris* Grt. (B.)...21.VII.44
1354 *Euxoa albipennis* Grt. (B.R.) .....Aug., Sept.
1366 *Euxoa divergens* Wlk. (B.) ..21.VIII.44
1370 *Euxoa obeliscoides* Gn. (R.) ....1.IX.37
1378 *Euxoa ochrogaster* Gn. (R.) .....25.VIII.43; 3.IX.43
form *insignata* Wlk. (B.) .....21.IX.44
1379 *Euxoa excellens* Grt. (B.) ...Sept., Oct.
—— *Euxoa lutcotincta* McD. (B.) 29.VIII.44
1403 *Pseudorthosia variabilis pallidior* Ckll. (N.R.).....October
1416 *Agrotis vetusta mutata* B. & B. (R.).....18.VIII.44
1426 *Agrotis vancouverensis* (typical) Grt. (B.) .....24.V.44; 8.VI.44
—— *Agrotis vancouverensis semiclarata* Grt. (R.B.).....May, June
1432 *Agrotis volubilis fumipennis* McD. (R.) .....5.V.39
1435 *Agrotis ypsilon* Rott. (N.R.)..30.VII.44
1442 *Feltia ducens* Wlk. (R.).....18.VIII.43 22.VII.42
—— *Copablepharon*, possibly new species (B.) .....7.VII.44
1475 *Eurois occulta* Linn (N.R.)
1476 *Eurois astricta subjugata* Dyar. (B.R.) .....30.VII.44
1477 *Eurois nigra* Sm. (B.N.R.) ..11.VIII.39; 16.VIII.44
1480 *Ochroplcura plecta* L. (N.R.) .....June, July
1494 *Metalepsis salicarum* Wlk. (N.)
1496 *Peridroma margaritosa* Haw. (N.R.) .....16.VIII.38
1499 *Pseudospaelotis haruspica inopinatus* Sm. (N.)
1510 *Diarsia rosaria* Grt. (B.R.)..May, June
1511 *Graphiphora c. nigrum* Linn. (R.) .....June, Sept.
1512 *Graphiphora smithi* Snell (R.) .....13.VIII.37
1517 *Graphiphora oblata* Morr. (B.N.) .....31.VII.39; 27.VII.44
1544 *Setagrotis planifrons* Sm. (B.) .....16.VIII.44
1550 *Anomogyna atrata* Morr. (R.)
1569 *Anaplectoides pressus* Grt. (B.) .....31.VII.44
1570 *Anaplectoides prasina* Schiff. (B.N.).....July, Aug., Sept.
1571 *Protolampra rufipectus* Morr. (N.)
1574 *Pseudoglaca olivata* Harv. (R.) .....19.IX.37; 16.IX.44
1575 *Cryptocala acadiensis* Beth. (N.)
1580 *Hemigraphiphora plebeia* Sm. (B.N.) .....8.VIII.43
1581 *Abagrotis erratica ornatus* Sm. (B.) .....July, Aug.
1590 *Abagrotis sambo* Sm. (R.)....29.VII.38
1597 *Abagrotis nefascia* Sm. (N.)
1598 *Abagrotis variata* Grt. (N.R.)..22.VI.38
1599 *Abagrotis scopeops* Dyar (R.)..8.IX.38
1614 *Ufeus plicatus* Grt. (B.R.) ....24.IV.40
1633 *Scotogramma trifolii* Rott. (B.R.) .....Aug., Sept.
1660 *Mamestra configurata* Wlk. (R.) .....5.VII.38
1662 *Polia discalis* Grt. (B.R.)....July, Aug.
1669 *Polia purpurissata crydina* Dyar (B.) .....6.IX.44
1672 *Polia grandis* Bdv. (N.R.).....June
1673 *Polia subjuncta* G. & R. (R.)...12.VI.38
*s. eleanora* B. & McD. (B.) .....24.VI.44
1678 *Polia nevadae canadensis* Sm. (B.R.) .....9.VI.44; 7.VII.44
1679 *Polia radix* Wlk. (N.)
1680 *Polia segregata* Sm. (R.)..March, April
form *negussa* Sm. (B.) ....28.IV.44
1684 *Polia tacoma* Stkr. (R.).....May
1689 *Polia meodana* Sm. (B.).....24.V.44
1691 *Polia adjuncta* Bdv. (N.)
1694 *Polia pulverulenta* Sm. (R.)..14.VII.38
1697 *Polia cristifera* Wlk. (B.).....18.VII.44
1699 *Polia lutra* Gn. (B.W.).Mar., Apr., May
1709 *Polia detracta* (?) Wlk. (N.)...28.V.06
1711 *Polia obscura* (?) Sm. (B.)....17.VI.44
1716 *Lacinipolia anguina larissa* Sm. (B.).....24.V.44
1735 *Lacinipolia vicina acutipennis* Grt. (B.) .....12.VII.44
1736 *Lacinipolia pensilis* Grt. (B.)..7.VII.44
1739 *Lacinipolia stricta* Wlk. (N.R.) .....Aug., Sept.
1744 *Lacinipolia lorea* Gn. (N.R.)...14.VI.44
1745 *Lacinipolia olivacea lucina* Sm. (R.) .....9.VIII.39; 12.VII.39
1746 *Lacinipolia comis* Grt. (B.R.) .....July, Aug.
*c. rectilinea* Sm. (B.) .....3.VII.37; 4.VIII.34
1751 *Lacinipolia illaudabilis restora* Sm. (B.R.) .....July
1800 *Sideridis rosea* Harv. (N.R.) .....25.V.38; 2.VI.44
1803 *Astrapetis sutrina* Grt. (B.)....17.V.44
1808 *Anepia ectrapela* Sm. (B.R.).....May
1841 *Orthodes curtica bostura* Sm. (R.W.) .....Aug., Sept.
1855 *Orthodes oviduca* Gn. (R.).....16.V.38
1886 *Orthodes contrahens infidelis* Dyar (N.R.) .....July
1890 *Orthodes furfurata uniformis* Sm. (R.) .....July
1891 *Orthodes communis* Dyar (B.R.) .....July, Aug.
1906 *Xylomyges hiemalis* Grt. (B.R.W.) .....March, April
1909 *Xylomyges crucialis* Harv. (B.R.) .....1.V.39
1914 *Xylomyges dolosa* Grt. (B.N.) 10.IX.44
1915 *Xylomyges rubrica* Grt. (N.)
1916 *Xylomyges perlubens* Grt. (B.N.R.) .....12.IV.40
1920 *Stretchia plusiaeformis* ? Hy. Edw. (B.) .....21.IV.44
1923 *Acerra normalis* Grt. (B.N.R.) .....March, April

1925 *Orthosia pulchella achsha* Dyar (B.) .....21.IV.44
1943 *Orthosia hibisci quinquefasciata* Sm. (B.N.R.) April, May, July, Aug.
1952 *Dargida procincta* Grt. (N.R.)
1955 *Zosteropoda hirtipes* Grt. (N.R.)
1992 *Leucania insueta heterodoxa* Sm. (B.N.) .....20.V.44
1995 *Leucania luteopallens minorata* Sm. (N.R.) ...June, July; 22.VIII.43
2026 *Pleroma obliquata* Sm. (B.) .....10.IV.44
2027 *Pleroma bonuscula* Sm. (R.) .....March, April
2029 *Pleroma cinerea* Sm. (B.) ..September
2041 *Cucullia florea obscurior* Sm. (B.R.) .....Aug., Sept.
2106 *Oncocnemis chorda extremis* Sm. (B.) .....6.VII.44
2122 *Oncocnemis figurata* Harv. (B.) .....24.VI.44
2133 *Oncocnemis chandleri* Grt. (R.W.) .....Aug., Sept.
2154 *Homohadena fifia* Dyar (B.) .....4.VII.44
2184 *Feralia deceptiva* ? McD. (B.) .....24.IV.44
2205 *Bombycia rectifascia* Sm. (B.) ...July
2210 *Brachylomia populi* Stkr. (B.) .....21.IX.44
2215 *Litholomia napaea* Mor. (N.R.) ...18.III.45; spring and fall.
2216 *Lithomoia solidaginis* Hbn. (B.) .....19.IX.44
2221 *Graptolitha innominata* Sm. (N.R.) .....20.III.38
2222 *Graptolitha petulca* Grt. (B.) .....Sept., Oct.
—— *Graptolitha pertorrida* McD. (R.) .....22.XI.43
2244 *Graptolitha georgii* Grt. (B.R.) March
2248 *Graptolitha fagina* Morr. (B.W.) .....9.X.43; 15.X.44
2261 *Xylena brucei* Sm. (B.) .....1.III.44; 18.X.44
2263 *Xylena cineritia mertena* Sm. (B.R.) .....March, April, May
2264 *Behrensia conchiformis* Grt. (B.R.) .....April
2268 *Platypolia anceps* Steph. (B.) ...3.X.44
2270 *Platypolia loda* Stkr. (W.) .....9.X.43
2278 *Fishia evelina hanhami* Sm. (R.) .....Aug., Sept.
2288 *Anytus profunda* Sm. (R.) ....6.IX.38
2303 *Eupsilia tristigmata* Grt. (B.R.) .....spring and fall
2310 *Lycanades purpurea antapica* Sm. (R.) .....Sept., Oct.
2313 *Rusina verberata* Sm. (R.) ..2.VIII.37
2315 *Rusina decipiens* Grt. (B.R.) .....13.VIII.38; 29.IX.43
2316 *Xanthia lutea* Strom. (N.R.W.) .....28.IX.43
2318 *Anathix puta dusca* Sm. (N.)
2321 *Eucirrhoedia pampina* Gn. (N.R.) .....Aug.; 4.IX.37
2322 *Homoglaea carbonaria* Harv. (B.R.) .....spring and fall
2323 *Homoglaea dives* Sm. (B.W.) .....spring and fall
2342 *Septis auranticolor sora* Sm. (N.W.) .....5.X.43
2351 *Septis arctica* Frr. (R.) .....9.X.43
2352 *Septis castanea* Grt. (N.R.) Aug., Sept.
2356 *Septis centralis* Sm. (B.) ....12.VII.44
2362 *Septis impulsa* Gn. (B.) .....1.VIII.44
2365 *Septis finitima cerivana* Sm. (N.R.) .....May, June, July
2368 *Agroperina dubitans* Wlk. (N.R.) .....June, July, Aug.
2375 *Crymodes devastator* Brace (N.R.) .....July, Aug.
2393 *Luperina passer* Gn. (R.) ...30.VIII.38
2400 *Aseptis binotata* Wlk. (N.R.) 14.VII.44
2401 *Aseptis adnixa* ? Grt. (R.)
2413 *Oligia indirecta* Grt. (B.N.R.) 1.VII.44
2423 *Oligia illocata* Wlk. (B.N.R.) .....20.VI.37; 12.IX.44
2424 *Oligia mactata allecto* Sm. (B.N.R.) ....20.IX.26; 24.VII.44
2467 *Hydroecia pallescens* Sm. (R.)
2533 *Euplexia benesimilis* McD. (B.N.R.) .....10.V.38; 20.VII.44
2536 *Phlogophora periculosa* Gn. (B.N.R.) .....July, Aug.
2557 *Chytonix divesta laticlava* Sm. (B.R.) .....August
2584 *Amphipyra pyramidoides* Gn. (N.R.) .....3.VIII.37
2602 *Andropolia aedon* Grt. (B.R.) ....July
2603 *Andropolia theodori vancouvera* Strand. (B.R.) .....Aug., Sept.
2609 *Hyppa indistincta* Sm. (N.R.) 1.VII.37
2640 *Neperigea niveirena* Harv. (B.) .....12.VII.44
2655 *Platyperigea multifera* Wlk. (B.) .....9.VI.44; 18.VIII.44
2656 *Platyperigea extima* Wlk. (B.) .....5.VIII.37; 11.X.44
2657 *Platyperigea meralis* Morr. (B.) .....1.VIII.37
2662 *Proxenus miranda nitens* Dyar (B.) .....15.VI.44
2685. *Enargia decolor* Wlk. (B.N.) 20.IX.44 form *infumata* Grt. (B.W. 25.VIII.43
2686 *Zotheca tranquilla f. viridula* Grt. (B.N.W.) .....22.VII.43
2715 *Pyrrhia umbra exprimens* Wlk. (N.R.) .....June; 12.VII.39
2885 *Annaphila decia* Grt. (N.R.B.) .....9.III.41; April
2913 *Melicleptria sueta* Grt. (R.) April, May
2931 *Heliothis phloxiphaga* G. & R. (N.R.) .....3.IX.37
3223 *Marathyssa inficita* Wlk. (B.) 9.VI.41
3235 *Sarrothripus revayana* Scop. (N.)
3254 *Autographa rect. nargenta* Ottol. (R.) .....1.IX.37; VIII.38
3256 *Autographa angulidens excelsana* Strand (R.) .....30.VI.41
3257 *Autographa alias interalia* Ottol. (B.) .....9.VIII.44
3265 *Autographa ampla* Wlk. (B.N.R.) .....28.VIII.43
3266 *Autographa selecta* Wlk. (R.) .....Aug., Sept.
3269 *Autographa brassicae* Riley (R.) .....7.VII.37
3286 *Autographa mappa* G. &. R. (N.)
3287 *Autographa pseudogamma* Grt. (N.)

3288 *Autographa californica* Speyer
(N.R.) .....29.IX.43
3291 *Autographa flagellum* Wlk. (N.)
3292 *Autographa metallica* Grt.
(N.R.) .....Aug., Sept.
3295 *Plusia aereoides* Grt.
(N.R.) .....July
3344 *Catocala relicta elda* Behr.
(R.) .....Aug., Sept.
3355 *Catocala californica* Edw.
(R.) .....Aug., Sept.
*Catocala c. edwardsi* Kus. (R.) August
3357 *Catocala briseis* Edw.
(B.R.) .....Aug., Sept., Oct.
3359. *Catocala pura* Hlst. (R.) .....July
3360 *Catocala nevadensis* Beut.
(R.) .....July, Aug., Sept.
form *montana* Beut. (R.) July, Aug.
3426 *Euclidina cuspidea* Hbn.
(R.) .....May, June
3431 *Caenurgina erechtea* Cram.
(B.R.W.) .....July, Aug.
3484 *Zale minerea norda* Sm.
(B.N.R.W.) .....May
3538 *Toxocampa victoria* Grt. (N.R.)
3551 *Melipotis jucunda* Hbn.
(N.R.) .....May, Aug.
3569 *Synedoida sabulosa nichollae* Hamp.
(B.) .....30.V.44
3572 *Synedoida ochracea* Behr.
(N.R.) .....May
3573 *Synedoida divergens* Behr.
(B.N.R.) .....June
3574 *Synedoida hudsonica* G. & R. (N.)
3578 *Synedoida adumbrata* Behr. .. .. ....
(B.N.R.) .....May
3615 *Scoliopteryx libatrix* L. (R.)
3684 *Spargaloma sexpunctata* Grt.
(N.R.) .....17.VI.44
3690 *Bomolocha palparia* Wlk.
(B.) .....17.VI.44; 12.VII.44
3706 *Hypena humuli* Harr. (N.R.)
3734 *Camptylochila americalis* Gn.
(R.) .....23.VIII.44
3735 *Camptylochila aemula* Hbn. (B.) July
3746 *Camptylochila lubricalis* Geyer.
(B.) .....July
3765 *Epizeuxis lutalba* Sm. (R.) ...23.VI.38
3766 *Chytolita morbidalis* Gn. (N.R.)
3797 *Bleptina caradrinalis* Gn. (N.R.)
3807 *Palthis angulalis* Hbn. (N.R.) ....June

PERICOPIDAE

3817 *Gnophaela latipennis vermiculata*
G. & R. (N.)

NOTODONTIDAE

3822 *Ichthyura apicalis* Wlk.
(N.R.W.) .....30.IV.41; 4.VI.43
3827 *Ichthyura albosigma specifica* Dyar
(N.R.) .....1.V.40
3829 *Datana ministra* Dru.
(B.N.R.) .....24.VI.44
3847 *Odontosia elegans* Stkr.
(B.N.) .....12.VII.44
3851 *Pheosia rimosa* Pack. (B.W.)
12.V.44 (Brill.); 4.IX.43 (Warf.)
3857 *Nadata gibbosa* Wlk.
(B.R.N.) .....May, June
3920 *Schizura ipomoeae* Dbldy.
(B.R.N.W.) .....June, July
3924 *Schizura unicornis* A. & S.
(B.) .....30.V.44; 24.VI.44
3934 *Cerura occidentalis gigans*, McD.
(R.) .....24.V.38
3938 *Cerura scolopendrina* Bdv.
(B.N.R.W.) .....April, May
3939 *Gluphisia septentrionalis* Wlk. (N.)
3940 *Gluphisia lintneri severa*
form *normalis* Dyar (B.N.) 23.IV.44

LIPARIDAE

3943 *Notolophus antiqua* L. (N.)
3954 *Olene vagans* B. & McD.
(B.R.W.) .....May, June

LASIOCAMPIDAE

3994 *Malacosoma pluvialis* Dyar
(B.N.R.W.) .....July, Aug.
3999 *Epicnaptera americana* Harr.
(B.N.R.W.) .....April, May

THYATIRIDAE

4004 *Habrosyne scripta* Gosse.
(B.N.R.W.) ....June, July, Aug.
4007 *Pseudothyatira cymatophoroides* Gn.
(B.R.) .....June, July
form *expultrix* Grt. (W.) ..5.VII.38
—— *Ceranemota albertae* Clke.
(B.) .....21.IX.44

DREPANIDAE

4020 *Drepana arcuata siculifer* Pack. (N.R.)
4021 *Drepana bilineata* Pack. (R.) 19.IV.38

GEOMETRIDAE

4023 *Brephos infans oregonensis* Swett
(B.R.) .....March, April, May
4059 *Nemoria darwiniata* Dyar
(B.N.) .....6.IX.44
4090 *Mesothea viridipennata* Hlst. (N.)
4134 *Xystrota rubromarginaria* Pack.
(B.) .....3.V.44
4144 *Scopula quinquelinearia* Pack.
(B.) .....17.VI.44
4153 *Scopula quaesitata* Hlst. (R.) 17.VI.38
4180 *Sterrha demissaria columbia* McD.
(B.) .....15.VII.44
4195 *Sterrha rotundopennata* Pack. (N.)
4211 *Cosymbia pendulinaria griseor* McD.
(R.)
4223 *Nyctobia limitaria nigroangulata* Stkr.
(B.) .....23.V.44
4229 *Lobophora magnoliatoidata* Dyar
(B.) .....7.V.44
4235 *Neodezia albovittata* Gn.
(B.N.R.W.) ....May, June, July
4239 *Oporophtera bruceata* Hlst.
(B.R.W.) .....Sept., Oct.
4243 *Oporinia autumnata omissa* Harr.
(B.R.W.) .....Sept., Oct.
4244 *Triphosa haesitata* Gn.
(N.R.) .....22.X.42; 10.XI.43
4248 *Coryphista meadi f. badiaria* Hy. Edw.
(B.R.) .....May, June
4267 *Eupithecia misturata* Hlst.[2]
(R.) .....1.IX.37
4276 *Eupithecia castigata* Hbn. (N.)
4288 *Eupithecia columbiata* Dyar (N.)

[2] Mr. Freeman reports that some **Eupithecia** identifications are tentative, and a few changes may result from examinations of the genitalia.

4290 *Eupithecia maestosa dyarata* Tayl. (B.) .....19.V.44
4331 *Eupithecia geminata* Pack. (N.)
4335 *Eupithecia perfusca kootenaiata* Dyar (B.) .....24.V.44
4338 *Eupithecia multiscripta* Hlst. (B.) .....28.V.44
4341 *Eupithecia georgii* McD. (N.R.)
4378 *Eupithecia probata* S. & C. (R.B.) .....14.VII.44
4383 *Eupithecia ravocostaliata Pack.* (N.R.) .....March
4393 *Horisme intestinata* Gn. (B.) ..1.VI.44
4398 *Eustroma semiatrata* Hlst. (B.N.R.W.) ..27.V.44; 25.VIII.44
4402 *Lygris propulsata* Wlk. (N.)
4407 *Lygris xylina* Hlst. (N.B.) ..13.VII.44
4412 *Plemyria georgii* Hlst. (N.)
4416 *Dysstroma citrata* Linn. (B.R.N.) .....Sept., Oct.
*c. mullcolata* Hlst. (W.) ...24.IX.43
4419 *Dysstroma ethela kasloata* Tayl. (W.B.) .....6.VIII.43
4429 *Ceratodalia gueneata* Pack. (B.N.R.W.) ....July, Aug., Sept.
4465 *Hydriomena furcata* Thun. (B.N.) .....March, July
4485 *Hydriomena renunciata f. pernigrata* B. & McD. (B.N.) .....16.V.39
4511 *Xanthorhoe designata emendata* Pears. (B.) .....21.VII.44
4513 *Xanthorhoe munitata* Hbn. (R.) .....14.IV.41
4515 *Xanthorhoe defensaria* Gn. (R.) 1.V.40
form *mephistaria* Swett (B.) .....31.VIII.41
4516 *Xanthorhoe ferrugata* Clerk (B.N.R.) .....April, May
4541 *Entephria multivagata* Hlst. (N.R.) .....16.VI.44
4546 *Mesoleuca ruficilliata* Gn. (N.R.)
4547 *Mesoleuca gratulata latialbata* B. & McD. (N.R.W.) April, May
4551 *Epirrhoe alternata* Mull. (N.)
4555 *Spargania magnoliata pernotata* Hlst. (B.N.R.W.) .....Sept., Oct.
4556 *Spargania luctuata* Schiff. (B.) .....10.VII.44
*Spargania l. obductata* Moesch. (R.N.) .....26.VI.38
4558 *Euphyia unangulata intermediata* Gn. (B.R.) .....June, July
4561 *Euphyia multiferata* Wlk. (B.N.R.) .....16.VI.44
4574 *Eulype albodecorata confusa* McD. (N.R.) .....July
4582 *Perizoma costiguttata* Hlst. (R.) May
4587 *Earophila vasiliata* Gn. (B.N.R.) .....April, May
4589 *Venusia cambrica* Curt. (N.)
4593 *Venusia* near *pearsalli* Dyar (B.R.) .....April, May
4603 *Eudule unicolor* Rob. (N.)
4605 *Bapta semiclarata* Wlk. (B.N.R.) .....May, June
4615 *Deilinia pacificaria* Pack. (B.) 11.VI.44
4616 *Deilinia bryantaria* Tayl. (B.) 10.VI.44
4617 *Drepanulatrix rectifascia* Hlst. (R.) .....24.IV.38
4622 *Drepanulatrix falcataria* Pack. (R.) .....16.III.40
4628 *Drepanulatrix pulveraria* Hlst. (R.) .....April, May
4630 *Drepanulatrix litaria* Hlst. (B.R.) .....Sept., Oct.
4634 *Drepanulatrix unicalcararia* Gn. (B.R.) .....May, Aug.
4645 *Sericosema juturnaria* Gn. (B.N.R.) .....1.VII.44
4688 *Semiothisa denticulata* Grt. (R.) .....14.VII.38
4725 *Semiothisa neptaria sinuata* Pack. (B.R.) .....5.VI.44
4757 *Itame quadrilinearia* Pack. (B.W.) .....July, Aug.
4759 *Itame anataria* ? Swett (B.) 27.VII.44
4762 *Itame* prob. *exauspicata* Wlk. (B.) .....July, Aug.
4768 *Itame plumosata* B. & McD. (B.) .....15.VII.44
4799 *Elpiste lorquinaria* Gn. (N.)
4801 *Hesperumia sulphuraria* Pack. (N.W.R.) .....July, Aug.
form *baltearia* Hlst. (B.W.) ..July
4809 *Paraphia subatomaria* Wood (R.) .....20.IX.37
4811 *Paraphia piniata* ? Pack. (B.) 1.VII.44
4908 *Vitrinella pampinaria* Gn. (B.N.W.) .....13.V.44
4913 *Anacamptodes emasculata* Dyar (B.N.R.) .....May, June
4918 *Anacamptodes vellivolata* ? Hlst. (B.) .....9.VI.44
4927 *Anacamptodes profanata* B. & McD. (B.R.) .....21.IV.40
4945 *Aethalura anticaria fumata* B. & McD. (R.) .....April, May
4946 *Ectropis crepuscularia* Schiff. (N.R.) .....March, April
4955 *Coniodes plumogeraria* Hlst. (B.R.) .....9.IV.44; 21.III.45
4963 *Erannis vancouverensis* Hlst. (B.R.W.) .....Sept., Oct.
4968 *Amphidasis cognataria* Gn. (B.N.W.) .....26.VI.43; 10.V.44
4998 *Euchlaena mollisaria* Hlst. (B.R.) .....August
5000 *Euchlaena vinulentaria ochrearia* McD. (B.) .....May, June
5002 *Euchlaena marginata albertanensis* Swett (B.) .....4.VI.44
5005 *Euchlaena tigrinaria sirenaria* Stkr. (R.)
5012 *Spodolepis substriataria danbyi* Hlst. (N.)
5015 *Campaea perlata* Gn. (N.B.W.) .....8.VIII.43
5027 *Philedia punctomacularia* Hlst. (B.R.) .....September
5034 *Plagodis approximaria* Dyar (B.) .....13.V.44
5042 *Anagoga pulveraria* f. *occiduaria* Wlk. (B.) .....May
5043 *Hyperetis amicaria* H.-S. (N.R.) .....May, June
5044 *Nematocampa limbata* Haw. (B.N.) .....July
5050 *Metarranthis duaria* Gn. (N.R.) .....27.V.39; 21.IV.40
5058 *Selenia kentaria* G. & R. (R.) ..April
5059 *Ennomos subsignarius* Hbn. (N.W.) .....August

5073 *Pero gigantcus* Grossb.
(B.N.R.W.) ....July, Aug., Sept.
5077 *Pero occidentalis* Hlst. (B.) ...30.V.44
5080 *Pero morrisonarius* Hy. Edw.
(R.W.) .....9.VI.43
5083 *Phengommataea edwardsata* Hlst.
(B.W.) .....Aug., Sept.
5091 *Enypia perangulata* Hlst.
(N.W.) .....11.VIII.43
5094 *Enypia moillicti* Blkmre.
(W.) .....11.VIII.43
5125 *Caripeta divisata* Walk. (N.)
5158 *Nvoterpes triangulifera* Pack.
(B.N.) .....24.V.44
5161 *Sicya macularia agyllaria* Wlk.
(B.N.) .....8.VII.44
5189 *Synaxis jubararia* Hlst.
(B.N.R.) .....21.IX.44
5191 *Synaxis cervinaria* Pack.
(R.B.) .....May, June
5210 *Prochoerodes forficaria* Gn.
(N.B.) .....24.VI.44

PYRALIDAE

5355 *Desmia funeralis* Hbn. (R.)
5436 *Evergestis subterminalis* B. & McD.
(B.) .....18.VIII.44
5455 *Nomophila noctuella* D. & S. (N.R.)
5479 *Loxostege commixtalis* Wlk.
(B.) .....17.VIII.44
5576 *Pyrausta pertextalis* Led. (N.)
5602 *Pyrausta fumoferalis* Hlst. (N.)
5625 *Pyrausta ochosalis* Dyar (N.)
5659 *Noctuelia rufofascialis* Steph.
(B.N.) .....23.VII.44
5725 *Scoparia centuriella* D. & S. (N.)
5747 *Scoparia basalis fernaldalis* Dyar
(B.) .....20.VIII.44
5758 *Pyralis farinalis* Linn. (B.N.R.)
5769 *Herculia florencealis* Blkmre.
(B.) .....20.VIII.44
5857 *Crambus pascuellus* Linn. (N.)
5883 *Crambus hortuellus* Hbn. (N.)
5892 *Crambus vulgivagellus* ? Clem.
(B.) .....6.IX.44
5907 *Crambus oregonicus* Grt.
(B.) .....20.VIII.44
5919 *Crambus trisectus* Wlk. (B.) 26.VIII.44
6022 *Jocara trabalis* Grt. (B.) ....12.VII.44
6042 *Tetralopha aplastella* Hlst.
(B.) .....15.VII.44
6227 *Laodamia fusca* Haw. (N.)

PTEROPHORIDAE

6563 *Oidaematophorus stramineus*
Wlshm. (N.)

OLETHREUTIDAE

6654 *Badebecia urticana* Hbn. (N.)
6727 *Olethreutes deprecatoria* Heinr. (N.)
6731 *Olethreutes glaciana* Moesch. (N.)
7109 *Epinotia solandriana* Linn. (N.)
7177 *Anchylopera lamiana* Clem. (N.)
7301 *Carpocapsa pomonella* Linn.
(N.R.) .....June, July

TORTRICIDAE

7369 *Platynota idacusalis* Wlk. (N.)
7378 *Archips persicana* Fitch (N.)
7388 *Archips argyrospila* Wlk. (N.)
7405 *Archips rosaccana* Harris (N.)
7408 *Archips fumiferana* Clem.
(B.) .....July, Aug.
7442 *Eulia ministrana* Linn. (N.)
7477 *Peronea* near *caliginosana* Wlk.
(B.) .....24.IX.44
7481 *Peronea variana* Fern. (N.)

COSSIDAE

7667 *Acossus populi orc* ? Stkr. (N.)

OECOPHORIDAE

8460 *Semioscopis inornata* Wlshm.
(B.) .....13.V.44

AEGERIIDAE

8708 *Synanthedon tipuliformis* Linn. (N.)
8789 *Albuna pyramidalis* Wlk.
(R.) .....May, June

PLUTELLIDAE

8878 *Plutella maculipennis* Curt. (N.)

TINEIDAE

9615 *Scardia anatomella* Grt. (R.)

HEPIALIDAE

9869 *Hepialus novigannus mackiei* ? B. & B.
(R.) .....27.IX.37

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AGRILUS VITTATICOLLIS AT CRESTON, B.C. (Coleoptera, Buprestidae).—It is not generally known that **Agrilus vittaticollis** Randall belongs on the British Columbia list, but I have taken over 40 at Creston (det. W. S. Fisher). They are beautiful little insects, silver-grey, with bright bronzy thorax, and occur on saskatoon (**Amelanchier alnifolia**). They prefer scrub bushes, and open, rocky situations. One may collect the place for years as I did, without suspecting the presence of **vittaticollis**, as they are adepts at the old trick of falling to the ground at the slightest alarm; even to stalk the bush and glance the eyes around, the instant they are detected they drop, as though they feel our look. But remain patient for several minutes and they will return to the leaves, either by flight or climbing, usually the latter. The dates for my series are from July 9 to August 1.—G. Stace Smith, Creston, B.C.

THREE SILPHIDAE IN BRITISH COLUMBIA (Coleoptera).—The following three records based on specimens in my collection extend the ranges of the species involved. **Silpha (Thanatophilus) trituberculata** Kby.: Salmon Arm, B. C., Summer 1931 (from collection of H. B. Leech); **Nicrophorus nigritus** Mann.; Vaseaux Lake, Okanagan, B. C., 10-VIII-13; **Nicrophorus hybridus** Hatch and Angell: Kamloops, B. C., 18 Aug. 1935. G. J. Spencer, collector (given to me by the collector).—Melville H. Hatch, Seattle, Wash.

FLYCATCHER EATING THE PINE BUTTERFLY (Lepidoptera: Pieridae).—Several years ago, while collecting butterflies here, I saw a flycatcher dart out and catch three successive **Neophasia menapia** F. & F., as they came along. Such birds must be of some significance in the natural control of this forest pest.—Harold R. Foxlee, Robson, B.C.

# MENTAL INSECT ATTACKS

George J. Spencer
Department of Zoology, University of British Columbia, Vancouver, B.C.

In the last eighteen years I have been consulted in connection with three cases of serious mental insect plagues. Each instance involved a middle-aged man, bachelor, in moderate or humble circumstances, living alone in a cabin or little house, afflicted with the idea that he was persecuted by small, fast-flying, tick-like insects that in one instance at least, "burrowed under the skin, causing intense irritation; the insects affected the back of the head and neck by day but at night got into bed and bit all parts of the body; they could be detected only as a streak when flying and moved too fast to be caught.". With minor variations, the symptoms of attack and the resultant hysteria, were alike in the three cases.

Two men were from Vancouver and one from the lower Fraser Valley; all three suffered from irritation and burns produced by the severity of various "dopes" with which they had rubbed themselves; none showed any spot or puncture that could be attributed to insect attack. No control measures and soothing salves that were suggested, were acceptable: the men apparently revelled in their afflictions although the hysteria and suffering were genuine enough and rather pitiable. In one case I recommended the "sweat" treatment, "that sweat induced by hard work was a sure cure against all such attacks," hoping to take the man's mind off his affliction but he did not report to me of the success or failure of this prescription.

Messrs. W. Downes and J. D. Gregson, of the Dominion Entomological laboratories at Victoria and Kamloops respectively, have kindly supplied me with additional records of this type. Mr. Downes' case concerned a lady in Victoria who, says Mr. Downes, "imagined that she was being bitten by small flies; she could see them in the air but much to her astonishment always failed to catch one. The hallucination was particularly marked at night when she imagined that she was being bitten about the arms and neck on which red spots appeared, said to be caused by the bites. She had not had much unbroken sleep for weeks on account of this and her health was rapidly deteriorating. On investigation of the premises I found a spotlessly clean house, reeking of sundry insecticides and disinfectants but not a sign of any insect. I suggested to her the use of an ordinary mosquito repellent which I assured her would keep all insects away. She used this and immediately obtained relief, getting unbroken rest for the first time for a long period. The trouble returned, however, after a fortnight and she was then placed in charge of a doctor. After a course of treatment for neurasthenia her troubles disappeared."

Mr. Gregson's record concerned a man 62 years of age, who wrote in to the laboratory from a town in Alberta, recounting in great detail his persecution by ticks which were "burrowing into his body and reproducing their kind under the skin," drilling up the neck and into the skull. He declared that he had cut out the first attackers from under the skin, bit by bit with penknife and forceps but later ones bored too deeply for cutting out although they could be distinctly felt; he was keeping some from entering his skull by scrapthem down under the skin of his neck, with a blade of a penknife. He had consulted a number of medical men and forwarded the name of one who was treating him at the moment. This doctor reported to the Kamloops laboratory, that the man's body presented no skin disturbances or constitutional troubles, that the affliction was purely mental and was yielding slowly to a mixture to be taken by mouth and to abundant reassurance that the treatment would be completely effective.

All these cases follow somewhat the same pattern and course of development. The trouble can hardly be called "Insectophobia" because the sufferer did not hate insects as such: it is a sense of being per-

secuted by one specific, though imaginary type of insect and constitutes a mental fixation or hallucination. All cases probably started from genuine attacks at one time or another, of lice or mosquitos or no-see-ums (*Culicoides*) and perhaps true ticks, which so worried them that the sense of suffering remained to form a mental plague when the insects themselves had passed. This was definitely so in the case supplied by Mr. Gregson, for the man had visited a mining property near Nelson, B.C., with some companions and all members of the party had been attacked by wood ticks which they had completely removed from their bodies and clothing. It was not until several days later that the mental trouble began in the man in question.

What was possibly an incipient case of this kind was encountered in Vancouver in an elderly couple, comfortably off financially, who had rented their house for the season. They returned to find it infested by a few bed bugs which bit both man and wife, and horror and disgust seized them; they rented another house and had their own home treated, cleaned and redecorated from basement to roof. The fear and loathing of the bed bugs followed them into the rented house and every speck on the walls, on the furniture or in their beds, turned into an imaginary bug and any sudden irritation or feeling on the skin developed into the intolerable itching of a bite.

At this stage I was called in by a friend who actually thought they had bed bugs. I found both people suffering from burns and irritation caused entirely by the number, variety and severity of the "dopes" they had used; the furniture, sheets and mattresses were stained by varied insect sprays including creosote washes, and the blankets had great holes burnt in them by lye. There was not a sign of a bug anywhere in the house.

It took two days of demonstration and persuasion to convince the old people that they had no bed bugs and were not being bitten and probably saved them from developing the same permanent mental delusion and suffering which affected the other people.

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NAPHTHA GASOLINE IN INSECT KILLING BOTTLES.—When making population counts of grasshoppers by sweeping, it becomes necessary to kill a large number in a short time. While working on these counts we found that even a quart-size cyanide bottle took too long so we employed a large candy jar containing a quart of methyl alcohol into which the whole tip of the net was dipped. This worked well but the alcohol soon became filthy and we substituted naphtha gasoline and have employed it ever since. It is the fastest killing substance we have used; three seconds is enough to penetrate a mass of grasshoppers as large as a baseball. Large-mouthed jars are sometimes hard to get so we now carry the gasoline in any quart bottle, from which the fluid is poured directly on to the mass of insects in the end of the net, whence it drips into a small tin can. So long as the insects are wetted they die immediately. The gasoline is poured back into the bottle from the can.

Less convenient to carry but equally convenient to use, is a one-inch diameter shell vial containing a little gasoline, with a wire gauze disc shoved half way down. Any insect caught in a net can be tapped into this bottle, which should be inverted and righted again as fast as possible and the insect removed with forceps. Too long immersion induces a rigor which is apt to snap off the legs, especially of grasshoppers whose hind legs invariably come up over their heads.

The gasoline evaporates in a matter of seconds and does not spoil the bloom on any dipteron, dragon fly or wasp on which we have used it; in fact it cleans insects by degreasing them, especially fresh bumble bees. It should not, however, be used to clean old dry bumble bees whose fur becomes matted when soaked in it.—George J. Spencer, Kamloops, B.C.

ON THE DESTRUCTION OF ALL STAGES OF INSECTS IN PULVERIZED CEREALS AND SPICES.—Within the last two years there has been put on the market a patented mechanical contrivance for sterilizing all types of pulverized cereal products and spices and possibly commercial fertilizers containing fish meal, that are subject to attack by insects infesting stored food products. It is called the "Entoleter" and consists of a relatively simple hopper-fed machine which hurls the material with forced draught through a nozzle, up against a plate, thus destroying all stages of any insect that might happen to be present.

According to the Canadian agent in Toronto, a considerable number of these machines of varying capacities has already been installed in cereal-manufacturing plants in the United States and in Canada. They should prove a boon to the industry on this coast and should reduce to a minimum, the instances of infested foodstuffs attributable to infestations prior to the goods leaving the factories and developing later inside the packages.—George J. Spencer, Department of Zoology, University of British Columbia, Vancouver, B.C.

# A NEW SUBSPECIES OF MONOCHAMUS NOTATUS
## (Coleoptera: Cerambycidae) [1]

GEO. R. HOPPING
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*Monochamus notatus* (Drury) occurs in eastern Canada and northeastern United States, its range extending as far west as Lake Winnipeg and Minnesota. It has also been reported from British Columbia (R. Hopping 1922:258; Dillon and Dillon 1941:75-76). However, this western form differs consistently from the eastern one as to the elytral sculpture and pubescence, and appears to warrant subspecific status.

### Monochamus notatus morgani
Hopping n. subsp.

*Male:* Length 31 mm.; breadth across humeri 10.5 mm.; colour brownish-grey on elytra, more cinereous on the head and prothorax, predominantly grey with black flecks beneath and on the legs; first two segments of antennae blackish-cinereous, remainder dull black, becoming brownish distally.

*Head:* Front with widely scattered coarse punctures, with areas of fine punctures interspersed which give rise to condensed cinereous patches of appressed short vestiture; coronal suture deeply impressed between antennal tubercles, fine and feebly impressed but entire on the occipital areas, this last fairly densely but not solidly covered with short appressed cinereous pubescence arising from patches of fine punctures; head beneath and genae moderately densely cinereous pubescent, the genae transversely carinulate laterally; antennae about two and one-half times the body length, the third segment a little more than twice the length of first and second combined and about one and one-fourth times the length of the fourth which is about equal to the fifth. *Prothorax* about as broad as long, with marginal bead and broad flat collar apically, transversely carinulate toward the sides; basal collar narrower, also carinulate laterally; disc of pronotum with median elevation devoid of condensed vestiture, but condensed cinereous vestiture nearly covering the lateral tubercles, two smaller patches anterior and two posterior on the disc. This condensed pubescence arises from groups of rather fine punctures, and in addition there are widely scattered coarse punctures; lateral tubercles large and blunt extending to nearly the breadth of humeri, strongly carinulate on the sides of pronotum beneath the tubercles. *Elytra* with side margins notably tapering from base to apex; humeri coarsely tuberculate, rather abruptly rounded; elytral sculpture rough and irregular with large and fairly dense punctures and with condensed cinereous patches interspersed with patches of black velvety pubescence of a different character, these last more scale-like and erect; apices evenly rounded to suture, where there is a very faint suggestion of prolongation. *Undersurface* including legs, mostly covered with appressed cinereous pubescence, but flecked with black where pubescence is absent; front of *prosternum* strongly transversely carinulate, *metasternum* more finely so, somewhat obscured by the grey vestiture; last ventral abdominal segment nearly straight across the hind margin at middle and with a faint suggestion of emargination.

*Female:* Length 26 mm., breadth across humeri 8 mm. Differs from male in having antennae more cinereous throughout, only slightly longer than the body, faintly annulated; front of head proportionately broader; margins of elytra nearly parallel; front legs not longer than middle or hind pair; last ventral abdominal segment strongly emarginate with a tuft of long black bristles on each side of the emargination.

*Holotype* male and *Allotype* female, No. 5538 in the Canadian National Collection, Ottawa. Type locality in both cases Trinity Valley, B.C. July 31, 1942 (male) and Aug. 15, 1942 (female), C. V. G. Morgan. *Paratypes* 10: two males and two females in the Canadian National Col-

[1] Contribution No. 2365, Division of Entomology, Dominion Department of Agriculture Ottawa.

lection, Ottwa; three males and three females in the Hopping Collection, Vernon, B. C.

Fifty-four specimens have been examined all from the white pine areas of the interior of British Columbia. Cyanide-killed specimens do not differ much in colour from living examples, but those preserved in alcohol lose much of the grey effect and the general colour becomes brown.

This subspecies differs from the eastern *notatus* by having notably coarser sculpturing on the elytra and more and generally larger black patches of velvety pubescence dispersed over the elytra. Actually these black tufts alternate with cinereous patches in rows between the costae. It is named for Mr. C. V. G. Morgan who has made a study (unpublished) of the biology and parasites of *M. notatus morgani*. His data suggest that it breeds only in western white pine (*Pinus monticola* Dougl.) *M. notatus notatus* breeds in *Pinus strobus* and has also been reported from *Pinus banksiana*, *P. resinosa*, *P. ponderosa*, and *Picea glauca* (R. Hopping, 1922). Discussing it under the synonymical name *M. confusor* Kirby, Craighead (1923:107) states "As far as known, it attacks only *Pinus strobus*. Packard ... and Hopkins record this species attacking living balsam fir (*Abies balsamea*) at Brunswick, Maine, probably confusing it with *marmorator*."

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**A NOTE ON THE TANGLE-WINGED FLIES OF BRITISH COLUMBIA** (Diptera: Nemestrinidae).—In 1930 I reported to this Society, the occurrence of the nemestrinid fly **Parasymmictus clausus** O.S. which I found laying eggs in telephone poles, fence posts and dried poplar trees on the cattle ranges at Riske Creek, Chilcotin. I have taken it frequently but not every year since, on the ranges at Lac du Bois, Kamloops.

The family Nemestrinidae consists of only some 150 species occurring chiefly in countries of hot dry climates with little rainfall; only 8 species have been found in Europe and 12 in North America, most being neotropical where they are well represented in Chile. Dr. Jos. Bequaert of the Harvard School of Tropical Medicine, the North American authority on these flies, informed me that **P. clausus** was a very rare fly and that its occurrence in the Chilcotin was the furthest north for any representative of the family, in the world.

Until 1943 this species was the only one of the family I had found in the Province but in that year Mr. E. R. Buckell and I found two males of a very similar species **Neorhynchocephalus sackeni** Will. on the dry cattle ranges near Kamloops and this year, 1945, it has been not uncommon.

As far as known, the larvae of the Nemestrinidae are all parasitic upon other insects. I have reared both our local species from grasshoppers, **P. clausus** chiefly from **Camnula pellucida** Scud. but very occasionally from other species of hoppers, and **N. sackeni** from **Melanoplus mexicanus mexicanus** Saus.

Larvae of both flies are so-called "tubed" maggots, breathing from the 2nd instar onwards by means of a tracheal sheath or funnel attached to the thoracic trachea of their hosts; the vortex of the funnel surrounds the posterior third of the larvae which move freely in the body cavities of their victims, as if tethered by these tubes.—**George J. Spencer**, Kamloops, B.C.

**HOLOPLEURA MARGINATA IN BRITISH COLUMBIA** (Coleoptera: Cerambycidae).—A female of this lovely crimson and black longhorn was taken at Arrowhead on May 30, by Charlie Slade. He obtained it by beating the foliage of a Douglas fir tree. When first seen by me the beetle was damaged, lacking head and prothorax, but was still fresh and relaxed. Examples of this species vary from 7 to 12 mm. in length, and the pronotum and elytra from almost entirely crimson to heavily marked with black. The beetles are rather flat, and somewhat resemble the Lycidae.—**Hugh B. Leech.**

**AGABUS CONFERTUS EATING CHIRONOMID LARVAE** (Coleoptera, Dytiscidae, Diptera).—Dissections of adults of **Agabus confertus** LeConte collected at Los Altos, Calif., in June, 1937 (E. S. Ross), showed that they had eaten large numbers of chironomid larvae, the so-called "blood worms." In each case the great amount of fine silt in the beetle's proventriculus indicated that both the larvae and the thin protective tubes in which they live had been eaten. The beetles must be able to swallow surprisingly large fragments, for the larval head capsules were found intact.—**Hugh B. Leech.**

# ON THE INCIDENCE, DENSITY AND DECLINE OF CERTAIN INSECTS IN BRITISH COLUMBIA

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It is a well known fact, supported by many records in literature, that certain insects indigenous to this country such as chinch bugs and some species of grasshoppers, bark beetles, cutworms and several forest-defoliating caterpillars, have more or less definite rythmic cycles of abundance and decline: the factors governing this increase are less well known than those producing the decrease although a great deal of research has been done upon them.

In the case of insects which have come in from a foreign country and have become established in North America, the pattern is somewhat different; after a period of often undetected establishment and gradual or sudden rise in abundance, the insect reaches a peak and then subsides to a level which remains fairly constant except for periodic or irregular minor fluctuations which are common to both native and to foreign insects. This is the case with the Hessian fly, the Gypsy and brown-tail moths, the cabbage butterfly, the San Jose scale, the European corn borer and the European earwig. Insects which may be cited as not yet having reached their level after importation, are the Jananese beetle in some of the Eastern States and southern Ontario, and the codling moth in its relatively new territory, the Okanagan Valley of British Columbia.

To repeat, while the factors producing an increase of any insect are not well understood, those bringing about the decrease may be one, or a combination of: —unfavourable weather conditions (as opposed to climate), predators, parasites, or sickness caused by fungous, bacterial, polyhedral or virus disease.

In the course of the last few years, a number of instances in British Columbia have come to attention in connection with several insect species, of the rare occurrence of one or two individuals only, of sudden rises in population followed by rapid or slow decrease, and of the invasion of an area by a species not hitherto recorded there.

In connection with the first item, namely the taking of one or two specimens only of a species in an area where systematic collecting has been conducted for nearly two decades, one is forced to ask "Why is an insect rare? If only one or two specimens are taken over a period of years, why should not more of them occur in the same place?" The rarity of an insect in any region is usually attributed to hostile weather conditions or to the presence of its natural enemies; on the other hand it may be attributable to insufficient collecting or to collecting at the wrong time, to the insect being at its extreme range in that area or to the fact that its Order or Family is dying out at this time of the world's history.

One of the criteria that I find useful for gauging the abundance or increase of any insect, is the number of letters of enquiry concerning it, that are sent in to the University; this is particularly true of insects of the household which have periods of increase and decrease in a normally very uniform though highly artificial habitat, the human home.

Instances of the rarity of one species or the fluctuation of others, can be cited in practically all Orders and are familiar to all entomologists, especially to those of this Province which has a richer and more varied insect population than any other part of Canada. At this time it is possible to select only a few outstanding instances of the many which have come to my attention.

Of the Order THYSANURA, the family MACHILIDAE is represented by some 5 species in the Dry Belt, all apparently undescribed, which either occur very rarely over a considerable area or in fair numbers in very restricted spots sometimes of only a few square yards in extent. Conditions

would seem to be ideal for their increase and spread but this does not occur. At the Coast a mottled species occurs rarely on the damp forest floor. Dr. M. L. Prebble informs me that he found an arboreal form common at the Coast, and H. B. Leech reports that speciments are sent in constantly from forest rangers all over the Province in connection with the Dominion Forest Insect Survey; unfortunately the latter are too battered to be identified.

Limited to one rocky headland at Departure Bay near Nanaimo, may be found large numbers of *Machilis maritima* L. a cosmopolitan species. It is difficult to see why *maritima* does not spread up and down the coast where conditions would seem to be ideal for it.

For years I have hunted for *Japyx* of the family JAPYGIDAE but have never yet found any; in Oregon it is not uncommon under bark of dead forest trees. In February 1945 Dr. Saunders of the University of Saskatchewan told me that he found a *Japyx* at Brentwood, Vancouver Island in 1944, under the rosette of leaves of a fall dandelion; intense search revealed only one more specimen. As far as I can determine, this is a first record for this Province.

Of the COLLEMBOLA, the late Dr. J. Folsom told me that at least 100 species should occur in this Province; at least a dozen species have been abundant every autumn for many years in the trash of the forest floor at the University. They were especially abundant in October 1943, but at the same time in 1944 every last specimen seemed to have died out; not one could be found in a large number of samples treated in the Berlese funnel. The summer of 1944 was very dry at the coast and this one season's drought seems to have wiped out the entire population of these tiny insects.

Of the ORTHOPTERA, only 2 species need be mentioned. The season of 1943 saw an increase of the lesser migratory locust *Melanoplus mexicanus mexicanus* Saus.; the autumn of that year was open and fine: *mexicanus* was seen on the Nicola ranges even until the first week in December. Every female must have laid her full quota of eggs and every last egg must have been fertile because 1944 saw an outbreak of this locust unparalleled in the history of this Province and it occurred in areas where it has never been seen before. Now we have had long, mild autumns before, and *mexicanus* is widely distributed; what combination of factors produced this devastating outbreak in 1944?

The other orthopteran under consideration is the European house cricket *Gryllus domesticus* L. which appeared first in Vancouver about 1934, being suddenly reported in numbers in two widely separated apartment houses, and a few specimens only, in one house in West Point Grey; it has occurred in small numbers for years in the locker rooms of a golf club on the outskirts of the city. No measures were taken to control the 1934 populations and I feared an outbreak of the cricket but it seemed to disappear entirely until April 1944 when it turned up in swarms in the furnace room of an apartment house at the junction of Broadway and Granville Street, several miles from the previous infestations. Where did it go during those ten years and what caused the 1944 outbreak?

About 1937, J. D. Gregson found *Grylloblatta campodeiformis* Walk. at Kamloops in the talus slope of Mount Paul, at an elevation of 1,400 feet only. The face of this slope is one of the hottest spots in the Dry Belt and *Grylloblatta* seems to retreat into the cold interior of the rock pile during summer, coming out to the surface only when November cools down the countryside with sharp frosts. Its previous records were from Lakes Louise and Agnes and on Rundle Mountain, in the Rockies, Alberta, and in British Columbia, a reported record from Forbidden Plateau near Courtenay on Vancouver Island and at the top of Grouse Mountain near Vancouver. To find it in numbers at 1,400 feet at Kamloops, provides a most remarkable record of discontinuous distribution. It is probable that further collecting in this Province, in late autumn will show that *Grylloblatta* is widely distributed

in locations similar to those occurring at Kamloops. The insect must have followed the skirts of the receding ice sheet 15,000 years ago and persisted in situations where it could retreat in summer time to near-frozen spots deep in rock piles.

Of the DERMAPTERA, the European earwig *Forficula auricularia* L., formed a terrible plague in Vancouver as late as 1927-28. Since then it seems to have reached an equilibrium at a rather low level and though it becomes fairly numerous some years, it is far from being the great plague it was two decades ago. Moreover its reduction cannot be attributed to the introduction of the tachinid fly *Digonochaeta setipennis* (Fallen) which is only now becoming apparent in some numbers in West Point Grey. This earwig is a good example of an imported insect increasing to outbreak proportions in a new country and then sinking to a fairly inconspicuous level. The conditions in the country remain the same: what has produced the equilibrium?

Contrast with this the case of the ring-legged earwig *Euboriella annulipes* (Lucas) which has existed for over a decade in the gardens of the Empress Hotel in Victoria without spreading out into contiguous gardens, let alone over the rest of the city.

Concerning the ISOPTERA or termites, the damp wood species *Zootermopsis angusticollis* (Hagen) which is widespread in the Vancouver region, on the Gulf Islands and on the mainland as far as Powell River, seems to be slowly increasing in the city of Vancouver where more and more complaints are coming in about its invasion of homes. One would think that with the building-up of the city this inhabitant of rotting timbers on damp ground, would decrease, but such seems not to be the case. The dry land termite *Reticulitermes hesperus* Banks occurs along the upper Fraser Valley from Lytton to Kamloops, up to the 1,800 foot level on the ranges. I have turned over literally hundreds of fallen fence posts on the ranges and know of only one post where a colony has existed for over ten years, and not in the posts on each side of it. What are the hazards which so restrict the distribution of this insect up the Fraser Valley?

Three records have come to hand in 18 years, of severe outbreaks of PSOCIDAE or book lice, originating in upholstered furniture in homes and one record of its increase from behind a damp draining board in a kitchen. Two species of these insects are common in practically every basement in Vancouver. Why do not these outbreaks become general all over the city?

Turning now to the MALLOPHAGA or bird lice, to date we have one record only of the biting cat louse *Felicola subrostratus* (Nitzsch) occurring on a kitten born and bred in Vancouver. Now cats are rather promiscuous animals, yet this louse is apparently rare in the city. The same thing goes for the dog louse *Trichodectes canis* Degeer, of which I have only two records from dogs born and raised in Vancouver and a number of records from dogs in Kamloops. It is a different matter with this louse on coyotes for on these animals it extends from the Merritt district up to the Bulkley Valley and sometimes in such immense numbers that it literally shears off all the fur from the poor beasts, leaving them almost naked with fur only on their tails so that trappers call them "flag-tails." Porcupines are widespread in the Dry Belt but though I have examined many specimens from widely scattered places, only those from Quesnel to Barkerville have harbored the louse *Eutrichophilus setosus* Giebel, a species which is specific to porcupines and which has been reported outside of this Province, from California to Alaska.

Again of the sucking lice ANOPLURA, we have the record published recently in our Proceedings (**35**: 27-28. 1939) of the yellow-bellied marmot collected by George Holland at Kamloops, when the poor beast was driven from its den in November by more lice than there were hairs on its body. Holland collected a half ounce bottleful of the insects and then threw away the animal in disgust. Why should this one marmot have had such an infestation when the scores that the Kamloops

laboratory staff has collected, usually have very few on them? Another instance of almost unbelievable louse abundance occurred in 1943 when a man living in a shack in Vancouver was reported to have been killed by the human body louse which left the dead body and spread over the walls and furniture and even crept out through the cracks around the door and on to the sidewalk.

Turning to more pleasant insects, the ODONATA, we all know that dragon flies occur everywhere in this Province, sometimes in considerable numbers in one place. During the summer of 1943 there occurred a three-day flight of one species of dragon fly on the campus at the University in such immense numbers as to attract the attention of even the most unobservant; on the 4th day there was not one to be seen. Unfortunately no one thought of keeping a specimen for identification. Whence came this migrating horde and where did it go?

Of the HOMOPTERA, two records are striking. The campus of the University was landscaped and planted in 1923-24; in 1931 there occurred a most conspicuous series of colonies of the giant aphid *Pterochlorus viminalis* (Fons.) on one of two similar willow trees whose branches almost touch one another. The aphid is relatively huge, at least one half centimetre long, with a conspicuous black tubercle on the middle dorsum. Essig says that it occurs throughout parts of Europe, Africa, Asia and in North America, and in California it is common on willow, rare on poplars and occurs occasionally on apple, apricot and peach. During the winter of 1931 the colonies which were only on the trunk and larger branches of the local tree, died out. Every year since the tree has been examined but not until September 1941 did the great patches of aphids appear again and were shortly attacked by some disease which literally liquefied the bodies into black drops which fell to the ground. I have never seen the aphids on any other trees at any other time. Whence did it come in such sudden great colonies? Mr. R. Glendenning who very kindly confirmed my tentative identification has told me that he took it once, in 1925 at Agassiz, on willow.

Again concerning aphids, in the autumn of 1929 a silver-leaf *Eleagnus argentata* transplanted to the campus in 1925, showed red aphid eggs covering all parts of the trunk so closely that the entire bush looked is if it had been painted red. Something killed off the eggs during the winter and they have never appeared since.

Of the HEMIPTERA, brief mention need be made of two species only. *Leptoglossus occidentalis* Heid., the large leaf-footed bug, suddenly showed up in Vancouver around Christmas time, 1939, in people's gardens where it was apparently hibernating. Since then it has been reported in increasing numbers and in 1944 it was sent in from many parts of the city, reported as crowding into houses for hibernation. Now K. F. Auden collected a specimen of this conspicuous bug in Vancouver in 1924; for what reason is it suddenly and steadily increasing?

The box-elder bug *Leptocoris trivittatus* (Say) which feeds on Manitoba maple, has been abundant in the Okanagan for at least 15 years. In the last 3 years it has shown up at Kamloops in such great numbers as to cause considerable alarm. In the autumn of 1944 it was sent in from Spence's Bridge with the report that it was present in large numbers although it had never been seen there before.

Instances of the abundance or scarcity of many species of the LEPIDOPTERA and COLEOPTERA are well known to every entomologist present. To mention only one instance of the latter, the varied carpet beetle *Anthrenus verbasci* (Linn.) invaded Vancouver apparently for the first time in 1937 and has since spread over the whole lower mainland until it now constitutes one of the worst pests in homes in the city; many people have had their homes cyanide-fumigated against it. Yet Dr. Melville Hatch, of the University of Washington, at Seattle, informs me that it has been present in that city for many years and that it is relatively inconsequential there.

Of the HYMENOPTERA, the species of

*Vespa* (*Vespula*) both black and yellow wasps, were so abundant in 1943 in many parts of the Dry Belt that they proved a plague of first magnitude, especially to fruit pickers. In 1944 queens and dwarf workers appeared in spring and then disappeared. (See p. 4 of the previous volume of this journal.) In 1945, up to mid-July, only 9 specimens of *Vespa* by careful count have been seen by two of us who are collecting them especially. This is the only instance of sudden rise and disappearance of insects where I dare to offer an explanation satisfactory to me. The year 1944 was very dry, and aphids, normally so widespread and abundant, were conspicuously absent. Now wasps feed their young on chewed-up animal food, largely insects, but the adults can consume only liquid food of which honey-dew is the main item especially of the white-faced wasp *Vespula maculata* (Linn.) I suggest that the wasp plague of 1943 died out in 1944 through failure of aphids and the consequent honey-dew crop.

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THE CAPTURE OF CALENDRA AEQUALIS FORM UNIVITTATA ON THE RUSH SCIRPUS ROBUSTUS (Coleoptera, Curculionidae). — On the Heron sheep ranges of the old Bulman lease north of Kamloops, at an altitude of about 1800 feet, lies an alkaline pond of some ten acres in extent. This contains from one to two feet of water each spring, but dries up in summer leaving an expanse of white alkali, deeply cracked and fissured. The pond is almost completely encircled with a belt of the rush **Scirpus robustus** Pursh. which is increasing each year forming in parts, a dense mat of roots sending up stems almost two feet in height.

Sweeping a net over the thickest part of these rushes in the third week in July, 1943, I got a specimen of the largest snout beetle I have so far collected in the Province, so I immediately beat over the area again but obtained only one more; however, on the thinner patches of rush that fringe the pond, the beetles were fairly common and I took thirty in all, roughly in the proportion of two females to one male. Both sexes vary in size from ½ to ¾ inch in length.

The beetles were feeding on the upper part of the rush stems and on the leaves, gouging out holes of considerable size. None were found mating, no eggs or egg punctures could be located, and slitting a number of stems showed no tunnels where grubs might have developed. The larvae probably live inside the root-stocks; if so, they must endure submergence in spring when the lake bed is flooded.

The adults have long and very sharp tarsal claws with which they cling so tenaciously to the smooth, polished surfaces of the rush stems that it was found necessary to grab them quickly and pull, all in one movement; if the pull was slow they tightened their grasp so effectively that they could be removed only when all tarsi broke off. If dropped, they feign death and then either dive down a crack in the mud or quickly climb another rush stem.

In a week's time they had practically disappeared, only two being found over the whole area.

ACKNOWLEDGMENTS. I am greatly indebted to Professor John Davidson of our University for naming the rush and to Mr. H. B. Leech for identifying the beetles for me.—George J. Spencer, Department of Zoology, University of British Columbia, Vancouver, B.C.

CALOSOMA LUGUBRE IN QUEBEC (Coleoptera, Carabidae).—**Calosoma lugubre** LeConte is a large carabid beetle whose metropolis is Texas, with isolated records as far north as Nebraska. I picked up one at Duparquet, Quebec (27-VIII-1936). It was identified by A. S. Nicolay, who was amazed at the record. The newness and remoteness of the locality barred out the possibility of it being introduced by man, but I have a single guess:—That summer a dark pall spread over our sky; at first it looked like smoke from distant fires, then more reminiscent of volcanic dust. Then the Press began to take notice, with reports of severe tornadoes in the States to the far south, and explained the cause of the darkened skies of our region as dust from the tornadoes. Had this powerful insect, capable of strong flight in its own right, been caught in the maelstrom of a tornado, then landed back to earth exactly where it should have—on the path of an entomologist?—G. Stace Smith, Creston, B.C.

WHERE TO LOOK FOR LUDIUS LARICIS (Coleoptera, Elateridae).—**Ludius laricis** Brown is one of the most distinctive and most localized click-beetles in our fauna. It was described in THE CANADIAN ENTOMOLOGIST for February, 1939, from a series of 30 specimens collected by myself at Creston, B.C., within an area of two acres. A few subsequent catches have been made, and all under unvarying circumstances. No other specimen is known. The field is now about exhausted, and surrounded forests and other likely places have been tested without result; but collectors in other localities where larch occurs might try their luck.

Adults of **L. laricis** are small, reddish-brown, without maculation, about 8 mm. in length; that is, slightly larger than **L. triundulatus** (Randall). They are found in the thick trunk bark of large western larch (**Larix occidentalis**), living trees only, usually about a foot from the ground, sometimes less, but never over two feet; they are well embedded in the bark, where they pupate, from 3 to 6 inches from the surface. I find no trace of them in the summer months, and the collection dates are from late October until early May.—G. Stace Smith, Creston, B.C.

## PRESIDENTIAL ADDRESS

J. R. J. LLEWELLYN JONES, M.A., F.R.E.S.

I have pleasure in welcoming the members of our Society to the 44th Annual Meeting and trust that our deliberations will be both profitable and interesting.

You have received the annual report of the Secretary-Treasurer. It shows a credit balance of $11.34 after the payment of all bills presented up to the date of the closing of the books. However, in order to do this, it has been necessary, owing to the continued rise in the cost of publishing the PROCEEDINGS to borrow from the Reserve Endowment Fund. The accounts of this fund show a figure of $76.17 which should be available for transfer to the Reserve, but unfortunately at the moment this cannot be done. You will at an appropriate time in our deliberations, be asked to approve some measure to enable this indebtedness to be met. The present value of the Reserve Endowment Fund is reported at $85.00. We should try to increase this sum annually, if only by a small figure and so strengthen our Society's financial position.

It is reported that the increase in the cost of publishing the PROCEEDINGS is the chief factor at the moment in bringing about this somewhat unsound and certainly unfortunate situation. It will I am sure be agreed by most of us present that it is imperative that we should take measures to ensure that our publications compare favourably with similar ones put out by other societies both as regards the set up and the contents, and that we should make them as interesting and informative as our financial position will permit.

I notice that we are scheduled to hear a paper entitled "Our journal, The Proceedings" to be read by Mr. H. B. Leech and I hope that, after hearing this and after due consideration and discussion of our finances, a satisfactory motion will be passed to strengthen our position in this respect.

Let us consider during the short time at our disposal the use of scientific and popular names for insects. Being a lepidopterist, the examples which I shall give will be from the Lepidoptera, though I have no doubt that many statements will also apply equally well in the case of other orders of insects.

Scientific names, both generic and specific, are for the most part derivations of Latin and Greek and are often found to be a combination of both. There are also names from other sources, some of doubtful origin, and others which do not appear to have any meaning.

However, in many cases, the scientific names give us certain information concerning the insect under consideration. For example a certain group of butterflies has been given the name *Polygonia*, a Greek derivative signifying many pointed or many angled, and it seems very appropriate as the wings of these insects are adorned with many indentations producing an almost ragged appearance. In the case of *Vanessa cardui* L. the specific name indicates that the larva feeds upon thistles. With *Hyphantria textor* Harr. the specific name points to the web constructed by the larvae. In other cases it will be noted that the specific name points to some locality or district or to some person. As examples of this may be cited, *Leptarctia californiae* Wlk. the californian tiger, *Feltia vancouverensis* Grt. the Vancouver dart, and *Tolype dayi* Blackmore, Day's lappet. In the cases of *Agrotis c. nigrum* L., *Calocalpe undulta* L. and *Bombycia rectifascia* Sm. it is to the markings on the wings that attention is drawn. Many names however are obscure and it is difficult, if not impossible, to discover any intelligible significance and this is very regretable.

Authors should be most careful, when bestowing scientific names to ensure that the proposed name has some appropriate significance. This is important insomuch as scientific names are by international agreement unchangeable once given; the oldest name taking precedence if it is not a homonym, and all others being reduced to the status of synonyms, subspecies, etc. It follows therefore that scientific names are the same in every language and in the

scientific literature of all countries and this is the strongest argument in favour of keeping them in active use.

For most people however, many of whom have not had the benefit of a "classical" education, or who know but little of science as a serious study, these names seem strange and bewildering, because they convey no intelligible meaning. They are known only to the initiated few. What then should we do with them? It is doubtful whether anyone would seriously consider the discontinuance of these names, but many might favour limitations in their use. It will be readily agreed that scientific names are appropriate during the deliberations of learned societies, in scientific literature, or in lecturing to students in scientific subjects. They should not be used, at any rate exclusively, in addresses or lectures given to the general public, in popular literature, or in general conversation with the average individual.

Consider the reaction of someone, who has brought for indentification an insect, on being informed that he has caught a specimen of *Pseudothyatira cymatophor*-been *Pseudohazis eglanterina nuttalli* Stkr. Such a person is likely to be quite disappointed because he has not been told anything that he can understand. To him the names sound strange and foreign and he will doubtless forget them very quickly. Had English names been used and the enquirer told that his specimen was the "two-toned lutestring" or Nuttall's sheep moth (though I admit that the former is not one of the best examples of a popular name), interest would probably have been maintained. Especially would this be true of the young, who very often have a distaste for any scientific names, chiefly because they do not understand their meaning, and because they sound odd and unattractive. It will be agreed that we should not neglect nor forget the young people and they should be encouraged in every possible way to become interested in scientific studies and so fill up our ranks in the future.

That a case exists for a more general use of popular names will be granted by most people, but there are certain difficulties to be faced. Popular names are sometimes rather fanciful and not always very appropriate. They are limited as to scope of circulation and possibly may vary from district to district, or province to province. Only a prolonged period of general use would correct this, the name gaining most popular favour being the one eventually accepted. This has now happened to some extent in Great Britain where English names have become standardized and are in quite general use for the macrolepidoptera at least.

As a basis for introducing popular names for the macrolepidoptera of this Province we have the check list prepared by the late E. H. Blackmore and published for the Provincial Museum in 1927. It contains, thanks to the efforts of Francis Kermode, a former Director of the Museum, popular names for nearly all the species found in this Province at that time.

Popular names are also found in W. J. Holland's "Butterfly Book" and in his "Moth Book", also in J. A. Comstock's book "The Butterflies of California." A scrutiny of these works will show a measure of agreement, though, as is to be expected, there are a few differences. For instance *Vanessa atalanta* L. generally known as the red admiral and so called by Holland and Blackmore, is by Comstock named the alderman, who states that this is an old English name for it, though at the same time admitting that it is less familiar and justifying his choice by stating that he wishes "to avoid confusion with the true admirals of the Genus Basilarchia." These he names the admirals but they are better called the white admirals as is done by Holland and Blackmore. However, *Vanessa cardui* L. is called the painted lady by all three, and this is a well established name. Among the moths *Aemelia roseata* Wlk. is named by Holland the rosy aemilia but by Blackmore the rosy tiger; the latter is to be preferred.

Speaking generally of the Blackmore list, the popular names there given follow closely those adopted by British writers in cases where either the genera or species occur in both areas and this would seem satisfactory, embodying as it does some

well established names. We find the Sphingidae designated by the well known term hawk-moths. However for the genus *Hemaris* of this same family the name clearwing has been used to replace the bee hawks of British authors. This would seem regretable as it may cause confusion with another large group of lepidoptera, now relegated to a position close to the microlepidoptera, for which the name clearwings is extensively used in Britain. The name tiger has been used for the subfamily Arctiinae and this is a well established popular name. Here we find one slight variation. *Arctia caja* L. is known in Great Britain as either the garden tiger or the common tiger. Blackmore terms our local sub-species *Arctia caja americana* Harr. the great tiger, probably wishing to draw attention to the status of our insect as a sub-species. Moths of the family Notodontidae are styled prominents, also in accord with British writers, having reference to the humps and excrescences found adorning many of the larvae in this group. Species of the genus *Cerura* have been termed kittens carrying on a tradition handed down by British lepidopterists whereby a large species of moth of an allied genus *Dicranura vinula* was called the puss moth and species of the genus *Cerura*, being similar both in the larval and perfect stages but at the same time being much smaller, were called kittens. The origin of the name puss moth is thought by some to be due to the curious habit of the larva when disturbed of hunching its back much after the manner of an infuriated cat under similar circumstances. Also it may be noted that the colouring of the moths much resembles that of a pale tabby cat, in many of the species comprising this group.

Among the geometers or loopers, moths of the genus *Hydriomena* have been styled highflyers. Holland gives no popular name here. Those of the genus *Eupithecia* have been dubbed pugs. Both are well established names for these genera.

We would do well to study the popular names which we already have more carefully and try to make wider use of them, hoping that where there are diversities of name for one insect, usage will eventually decide the issue.

In cases where there are no popular names, such a name should be given. It should be a comparatively simple one and should preferably describe or point to some peculiarity or notable feature in the insect during one of its stages. As an example, the family Drepanidae were named hook-tips because in many of the species the primaries have hooked tips.

Care however should be exercised not to produce a meaningless name, which might easily happen by attempting a mere translation of the scientific one. The best popular names in use are in no way translations. There is a valuable list of over a thousand names ("Common names of insects approved by the American Association of Economic Entomologists." Jour. Econ. Ent. **35**(1):83-101. February 1942), approved by a committee of both the A.A.E.E. and the Entomological Society of America. This paper lists the insects alphabetically, first by their common names, then by their scientific ones, and is thus an excellent quick reference medium. Copies may be obtained from the business manager of the A.A.E.E., Dr. E. N. Cory, College Park, Maryland, U.S.A.

To conclude: both scientific and popular names are desirable, but care must be taken to use the appropriate one at the opportune moment and on a suitable occasion.

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LIMONIUS RUFIHUMERALIS IN BRITISH COLUMBIA (Coleoptera: Elateridae).—Some specimens of the red-shouldered **Limonius** placed as **crotchi** (Horn) in collections, prove to be the recently described **L. rufihumeralis** Lane (1941. Pan-Pacific Ent. 17 (3): 133-139). Examples of this species in the Hopping Collection are labelled as follows: Vernon, June 5, 1921, and May 1, 1924 (Ralph Hopping); Aspen Grove, May 30, 1931 (H. Richmond), and June 4, 1931 (J. R. Howell); Midday Val., Merritt, June 14, 1926 (Wm. Mathers); Trinity Valley, June 25, 1929 (J. R. Howell).—Hugh B. Leech.

# In Memoriam

## ABDIEL WILLIAM HANHAM, 1857-1944

It is with deep regret that we record the passing, on Jan. 18, 1944, at the age of 86, of another old and valued member of our Society. Mr. A. W. Hanham became a member of the British Columbia Entomological Society in 1905.

He came to North America from England in 1881, landing at Philadelphia and from there went to Missouri. Shortly after, he joined the Bank of British North America in Montreal, but was moved almost at once to Kingston, Ont., and then to Ottawa. From there he went to Paris, Ont., then to Hamilton and Brantford, Ont., thence to Quebec City in 1891, to Winnipeg, Man., in 1893, to Victoria, B.C., in 1901, and finally to Duncan, B.C. In 1905 he was appointed manager of the Bank of B.N.A. at Duncan, in which post he continued until his retirement in 1921. He made his home at Quamichan Lake, near Duncan. From late January to May, 1905, he was in Southern California, collecting chiefly at La Jolla, near San Diego, and also at Avalon on Santa Catalina Island.

Mr. Hanham was a keen lepidopterist, but was also interested in Coleoptera and made extensive collections of both orders. The greater part of his British Columbia material was presented by him to the Provincial Museum, Victoria, B.C., shortly before his death. His interests, however, were not by any means confined to entomology and he was even better known as a conchologist, being a recognized authority on mollusca, both marine and terrestrial, and he accumulated a large and important collection of shells. On one occasion, when a collector sent some shells to the United States National Museum for identification, the specialist to whom they were sent replied: "I do not know why you send shells to me when the best authority on the subject, Mr. A. W. Hanham, is living in your own district."

While not a frequent attendant at the meetings of the Society, except in its early years, nor a contributor to its Proceedings, the late Mr. Hanham gave valuable aid to fellow members or other students of entomology or conchology. The Society's files contain many letters from him to members of the executive, and show that his interest and council were greatly appreciated. Hospitable, generous, kindly and full of unbounded enthusiasm for his favourite sciences, his knowledge and experience were always available to others, and through his extensive collecting and studies he has added much to our knowledge of Canadian mollusca and insects.

—W. DOWNES

Species and Subspecies of Lepidoptera Named in Honour of A. W. Hanham.

*Melitaea hanhami* Fletcher
*Orthodes hanhami* B. & McD.
*Fishia evelina hanhami* Smith
*Eremobina hanhami* B. & B.
*Philometra hanhami* Smith
*Sterrha hanhami* Hulst.
*Eupithecia hanhami* Taylor
*Pyla hanhamella* Dyar

## ENTOMOLOGICAL PUBLICATIONS BY A. W. HANHAM

All in the *Canadian Entomologist* (C.E.) and the *Proceedings of the Entomological Society of British Columbia* (Proc.)

1884. Entomological notes. C.E. **16** (5) :98-99.
1886. Entomological notes, Spring, 1886. C.E. **18** (7) :137-139.
1894. Notes from my diary, Quebec, 1893. C.E. **26** (10) :294.
1894. Notes on Quebec Coleoptera. C.E. **26** (12) :350-352.
1895. List of butterflies taken at Winnipeg, Man., 1894. C.E. **27** (5) :123-124.
1897. Brephos middendorfi, Men. C.E. **29** (1) :3.
1897. A list of Manitoba moths. C.E. **29** (12) :291-297.
1898. Notes on collecting "at light." C.E. **30** (2) :33-36.
1898. A list of Manitoba moths. C.E. **30** (3) :65-69.
1898. Notes on collecting at bloom. C.E. **30** (7) :188-190.
1899. A list of Manitoba moths. Part II. C.E. **31** (3) :49-52. Part III, **31** (8) :197-206. Part IV, **31** (11) :312-320.
1900. Additions to the list of Manitoba butterflies, with notes on other species. C.E. **32** (12) :365-367.
1901. List of Manitoba moths. Part V. C.E. **33** (8) :213-220.
1914. Sunflowers as a lure for the Plusiidae. C.E. **46** (4) :145-147.
1924. Notes on collecting at flowers and blossoms. Proc. **21**:15-19.

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COLLECTING NEOCLYTUS PROVOANUS AND N. BALTEATUS (Coleoptera, Cerambycidae).—In 1931 when the late Ralph Hopping identified **Neoclytus provoanus** Casey for me he noted that it may be a variety of **balteatus** LeConte. In the description Casey mentions that he at first thought it might be **balteatus.** The question is still unanswered. There are several characters separating the two and in a fairly good series of both species these characters hold. The most conspicuous difference is in the basal band of the elytra, which in **balteatus** is sharply defined, but in **provoanus** extends over most of the base. Recently C. A. Frost examined some of my material, and of **provoanus** writes: "I think it is a very good species." But there is one suspicious point: both forms are taken together on the same unexpected plant. Since, at Creston, B.C., I discovered their hide-out I have not had an opportunity to investigate if the same holds good for other localities. They are found on the underside of the large leaves of mullein (**Verbascum thapsus**) in the late afternoon and evening. In this way I have taken 10 **balteatus** (July 7-25) and 16 **provoanus** (July 13-Aug. 10). Nothing is known of the larvae. I have searched numerous plants, from the roots upwards, and am convinced that **Verbascum**, besides being an alien, is not the host.—G. Stace Smith, Creston, B.C.

## NEW MEMBERS

Elected at the 44th Annual Meeting, Feb. 24, 1945.

Baverstock, William—Provincial Horticultural Branch, Vernon, B.C.

Guppy, Richard—R.R. 1, Marine Drive, Wellington, B.C.

Muir, Mrs. Margaret A.—Ganges, Salt Spring Island, B.C.

Palmer, B. F.—Kaslo, B.C.

Wisenden, Miss Grace—Box 236, Prince George, B.C.

**Associate Member**

Riedemann, Karl Anton—Alkali Lake Ranch, Alkali Lake, B.C.

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STENICHNUS OVIPENNIS IN BRITISH COLUMBIA (Coleoptera: Scydmaenidae).—Casey described **ovipennis** from California as a species of Scydmaenus (1897. Ann. N.Y. Acad. Sci. 9: 480-481). A single specimen of this tiny reddish-brown beetle, slightly less than 1.5 mm. long, was found about 5 miles north of Lumby, B.C., September 16, 1943. It was under an old board lying on the top of a coniferous stump on the site of an abandoned mill; identified by W. J. Brown.—Hugh B. Leech.

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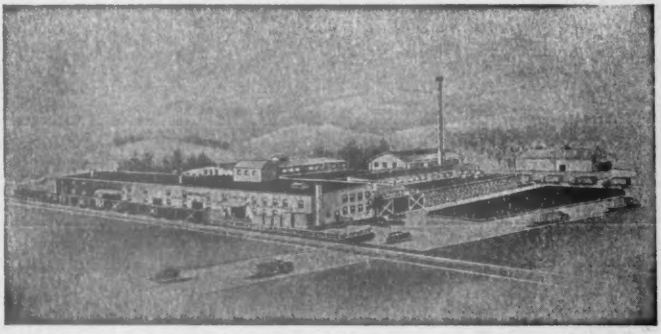

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